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[OFFICIAL NOTICE.]

Western Gas Association.

SECRETARY'S OFFICE, WESTERN GAS ASSOCIATION,
QUINCY, ILLS., April 9, 1890.

The Thirteenth Annual Meeting of the Western Gas Association will be held at St. Louis, Mo., on the 21st, 22d and 23d days of May. The Lindell Hotel will be used as our headquarters on this occasion.

The usual reduction in transportation rates has been secured and the necessary certificates for obtaining the same will be mailed to our members on or about the 10th of May.

On the 15th of February the Special Committee on the Assignment of Papers assembled at St. Louis for the purpose of choosing subjects and assigning authors for the same. It is a pleasure to state that the responses to the requests of this committee have, in almost every instance, been favorable. The Association can, therefore, rely upon the fact that the paper contributions to the Thirteenth Annual will be of a high order of merit. The list will be announced in these columns later on.

It gives me great satisfaction to be able to say to the members that the Executive Committee has decided upon a plan for the holding of an exhibition, on a large scale, of gas apparatus of all descriptions, the display to continue during the three days of the meeting. The exhibition room is located on the third floor of the new office building of the Laclede Gas Light Company, which room, besides being capacious and well lighted, is easily accessible on account of an excellent service of passenger and freight elevators. Beyond a doubt the members of the Association will recognize in this a most graceful and serviceable act on the part of the officers of the Laclede Company.

Although "The Western" contains on its lengthy membership list the names of a large number of executive officers of the gas companies that are embraced within its territory, the fact still exists—and it is a painful one—that there still remain a considerable proportion of our Western and Southern companies who have not yet sent delegates to our annual reunions. It is the intention of the Secretary to send a circular, calling attention to the great good accomplished by Gas Associations generally, to the President of each and every company that still remains unrepresented on our roll book, accompanied with a request that he shall send his Superintendent to our St. Louis meeting. These circulars will be issued at an early day, and will be mailed to every gas company President from the Alleghenies to the Rockies, and from the Great Lakes to the Gulf. If any of our members, or those who are contemplating becoming members, can lend a helping hand in this movement, they will confer a favor upon the Secretary. Application blanks and copies of our by-laws will be mailed to those who desire them.

A. W. LITTLETON, Sec'y.

BRIEFLY TOLD.

THE WESTERN'S THIRTEENTH ANNUAL.—Our readers no doubt have read with interest the current official notices now being printed in our columns over the signature of Secretary Littleton, respecting the Thirteenth Annual of the Western Association, which gathering is eagerly looked forward to, not by its own membership alone, but by almost

every gas man who is compelled by stern necessity or the travail of business to reside east of Chicago. At the outset, however, one's desire to foretaste the privileges and profits and pleasures of the coming convention at St. Louis, is lessened, in that a somber pall hangs dimly between the Association's last tryst and the one soon to be brought off, in that its President-elect—the lamented and esteemed E. J. King—having been called to "Sleep the sleep that knows not waking," will not sound the summons to duty. But in their grief his confreres may seek and surely find solace if not comfort in the knowledge that his example lives with them to stir them on to closer union in upholding the trusts committed to their care. It is also comforting to know that the reins that fell from the master's hands were grasped by one in every sense qualified to use them rightly in their capacity for direction. From the Secretary's notice it will be seen that he comes out in characteristic manner in the frank admission that the Special Committee on the Assignment of Papers has admirably answered the purpose for which it was formed, and we have from him the further satisfactory knowledge that those who were "named" by the Committee have not sought to evade the duty imposed on them. It is this spirit of union that has made the Western Association what it is, and it may be well understood that under the guidance of such sustained impulses the Western is not to be the thing of a day. Mention of the Association's superlative Secretary recalls the fact that he has been sadly bereaved in the recent death of his father, whose failing frame succumbed on the 12th inst., at his home in Lincoln, Ills. It is true that the senior Littleton had carried the burden of eighty years of life, but the burden seemed to rest so lightly that those nearest him imagined that more of life was to be his. We mention this, apart from our desire to tell the Secretary's friends of his bereavement, to follow it with the remark that despite his personal cares at such a time he still finds space wherein to prepare a herald of the coming meeting. We note with great satisfaction that the Executive Committee has determined upon an exhibition of apparatus connected with the manufacture, distribution and consumption of gas, and that said exhibition is to be held in the elegant and capacious lofts over the newly-finished offices of the Laclede Gas Light Company. Perhaps Egner may be said to be largely responsible for this determination—that is, in the matter of holding the exhibition—and it is certainly a most graceful act on the part of the Laclede Company to offer a house location for the display. We hardly suppose that any necessity exists for us to recall to the minds of the manufacturers of gas apparatus the advantages, of a purely commercial character, that are to be theirs from a practical participation in this exhibition. Mr. Egner has full charge of the arrangements for the exhibition, and this is a guarantee that fairness and absolute impartiality are to rule in the management of the affair. Exhibitors need not remove their goods until such time as will best serve their convenience—which is an extra inducement, perhaps, in the case of those who will contribute bulky articles to the display. In fact, we hope that every one of our advertisers will figure in the exhibition catalogue and on the floor or shelves of the exhibition room. It will pay them handsomely, too. Perhaps we may be forgiven for anticipating somewhat the matter that will appear in Mr. Littleton's succeeding official announcements, but in any event it may be whispered about that the Lindell is to be headquarters, and that the Local Committee of Arrangements have outlined a plan for the entertainment of the members, in the matters of banquet and outing, that is superb almost unto lavishness. More complete details of the meeting programme will follow in later issues.

ANNUAL MEETING, BRIDGEPORT, CONN.—The stockholders of the Bridgeport Gas Company elected the following Board of Directors on the 15th inst.: Messrs. Wm. R. Higby, Wm. D. Bishop, S. C. Trubee, H. L. Clark, Wm. H. Perry, H. Nichols, S. B. Beardsley, Wm. B. Hincks, and A. C. Hobbs. The following officers were elected: Prest., W. R. Higby; Sec. and Treas., F. B. Sammis; Supt., C. A. Gerdenier.

ON TO WASHINGTON ONCE MORE.—That picturesque party named Ingalls, who represents Iowa in a Senatorial capacity, has introduced, "by request," a bill to authorize the Commissioners of Washington, D. C., to provide illumination "by gas, or electric, or other lighting system." In furtherance of that proposition they are "authorized to purchase the plant of the Washington Gas Light Company, provided it can be bought at what it would cost to duplicate it," the assessment or valuation to be "set up by five experts." The bill also provides that if the Gas Company declines to sell, then the Commissioners are to put in and operate an independent plant for the general supply of gas to the residents, "the rate which may be charged therefor to be not in excess of 10 per cent. over the cost of production and distribution." The bill also appropriates $1,000,000 for the promotion of the objects named. Is it not time that the Washington Gas Light Company ceased to be a mark for such arrows as this? Every session we are treated to a like sortie; but there is some satisfaction in realizing that so far the attacking parties have met with defeat, and there is even greater satisfaction in the belief that as it was with the others so shall it be with this.

ANNUAL MEETING, ROCHESTER, MINN.—At the annual meeting of the Rochester (Minn.) Gas Light Company the following officers were chosen: President, C. H. Myers, of Dubuque, Ia.; Vice-President, Thos. Hennessy, Grand Forks; Secretary and Local Manager, A. T. Stebbins; Treasurer, O. Mulcahy, Grand Forks.

NOTES.—The proprietors of the Kingston (Can.) Gas and Electric Light Companies have agreed upon a plan for consolidation. As soon as the arrangement is perfected a bid of 35 cents per night per arc (2,000-candle power) for all-night lighting will be submitted to the authorities. Under the ruling practice the city pays 30 cents for a midnight service.——President Geo. W. Morris, of the Louisville (Ky.) Gas Company, says that the demand for artificial fuel gas in that city is as yet not up to the expectations of the proprietors.——The proprietors of the Portland (Me.) Gas Light Company have arranged with the special money order agencies of the American Express Company for the collection of gas accounts. The points at which payment may be made are six in number, and were selected with especial reference to the convenience of the consumers. The fees for the service are as follows: On bills of less $5, five cents; $5 to $10, eight cents; $10 to $20, ten cents. This plan, which is now in operation in several cities, is rapidly gaining favor.——A correspondent informs us that 109 arcs are in use by the city of Omaha, Neb., and then goes on to say: "In some places gas and electric lamps are burning during the same hours, but they are localities which the inspector has not been able to visit. According as he discovers that the electric lamps illuminate the vicinity he orders the removal of the gas lamps, and from that moment pay for them ceases. Thus far 309 gas lamp have been discontinued. At the rate of $31 per year, which was the old price, the cost of these lamps for a year would be $9,579. At the present rate, $25 per lamp, the cost would be $7,725. The 109 lamps which supplant the gas lights cost $18,100.——The Rhode Island House of Representatives, on Wednesday of last week, debated the bill which sought to restrict the gas companies of the State to the manufacture of a gas containing not "more than 10 per cent. in volume of carbonic oxide, or any sulphureted hydrogen." The debate was rather lively, in that it was spiced with a liberal portion of personalities. In the end the bill was "indefinitely postponed."——At the annual meeting of the Chuctanunda Gas Light Company, of Amsterdam, N. Y., no change was made in the executive management. This is not to be wondered at, considering the fact that an 8 per cent. return was made to the shareholders during the twelvemonth.

The Market for Gas Securities.

During the week speculation or investment demand for city gas shares assumed something like activity, if not briskness. Consolidated, on fairly large transactions, moved up sharply, going in the early transactions to 97¾. From this point it sagged off, but at no time did it go below 97, and to-days opening transactions (that is, Friday) were made at 97½. We look forward to a near crossing of the par line, and with no idea that a long stop will be made at the minimum three-figure quotation.

Other city shares are stronger. In Brooklyn the market appears to be all in favor of the holder, and the tone is undoubtedly in line with still higher prices. The reason for this state of affairs in Brooklyn is to be found in the bald truth that the Edison incandescent lighting supply is a failure, utter and complete. Frugal Brooklyn counts the cost of everything that it uses, and its verdict seems to be that gas is cheaper and better than Edison incandescent electric lighting.

Chicago Trusts are up to 48¼, and the 50 mark will soon be scored. The Managers of the Company have prepared a plan which will lead it into perfectly safe paths; but as the meeting to fix the thing will be held next Thursday, it may be as well to say nothing about the outcome now. Laclede common is woefully weak, being down to 13. Bay State gas is mending, and we believe that at anything under 25 it is a purchase. Muller sold at auction last week 54 shares of Jersey City gas at 170. Baltimore gas is a trifle stronger, at 49½ to 49¾. A marked feature of the day seems to be the neglect exhibited by investors over bond issues, which, in our judgment, are all too low in quotations. In the meantime it is certain that any gas stock which has something like a reasonable prospect does not have to wait long for a purchaser.

[Official Report.—Revised by the Secretary—Concluded from page 521.]

SIXTH ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

Held at the Boody House, Toledo, Ohio, March 19 and 20, 1890.

Second Day—March 20—Afternoon Session.

The President—The next question is: "*What is the average life of a meter in constant use, with ordinary good care?*" I don't think any one need to be afraid of discussing this matter on account of the meter men that are present. I only see one or two just now.

Mr. Hyde—I would like to hear some of the meter men state how long a meter will last.

Mr. Graeff—I understand that Dr. McFadden has a meter in a house near him that was put in when he was a small boy, and he is waiting to see how long it will last, in order to answer your question. (Laughter.)

Dr. McFadden—I am not a member of your Association, and I don't like to impose upon you.

The President—We will be very glad to hear from you.

Mr. McFadden—I have known a dry meter to last 30 years, and if you ask me the average life of a dry meter I should want to know what kind of gas you made; for it depends very much on the quality of the article which passes through it. If your gas is sulphurous, as you all know, you will have corrosive action. We had some meters sent to us for repairs, that were made by a competing house. I went to the party and said, "With this gas you can't get these meters made here, or anywhere else, to last." The trouble was in the character of the gas. It formed a filmy oil which, as the gas moved, spread out like thin soap bubbles and burst, and with that came the oscillation of the light. I think myself that the different qualities of gas that have been made in the last 20 years have affected the life of meters differently. In my earlier days we knew nothing but coal gas, pure and simple. I think meters lasted much longer then. We have had meters come into our "hospital," or repair shop, in which the leathers had become as hard as buckboard. The oil is thoroughly extracted by some drying or dessicating substance in the gas. Some are corroded; and there are various diseases of meters. It would take more than one doctor to classify them all. We, as makers of meters, have not the experience which you gentlemen have, with the use of them. We always recommend that you treat a meter very much like you would a man. Keep him in constant service and he will wear better and last longer and behave more accurately. I know we have what we call lazy Monday, and we hate to go to work on Tuesday, and if we have a lazy Tuesday it seems to grow. Constant use and proper care I should advise for every meter. What the average life to-day of a meter is I could not answer. I have known them to last 30 years—a dry meter. The unfortunate thing for the meter makers is that they last too long.

The Secretary—The patient public are under the impression that Mr. McFadden's advice is being heeded by the gas companies, viz., to keep the meters in constant use night and day.

Dr. McFadden—There are public fallacies as well as public truths.

Mr. Hyde—Mr. McFadden spoke of one meter lasting 30 years. Recently a Glover meter was taken out at Cleveland—no meters have come from England since '61, that is 29 years ago—that was set prior to 1860, and it is good yet, apparently as good as ever, as far as we could see. I may also say that I believe that 15 years would be a fair average.

Dr. McFadden—I would like to ask Mr. Hyde if he thinks the character of the gas has not a very great influence on it?

Mr. Hyde—That has a great deal to do with it.

Mr. Matt—How about the location of the meter?

Mr. Hyde—That has something to do with it. How it is cared for, and all about it.

The President—In discussing the life of a meter, I would call the attention of the Association to the following questions in the question-box:

"*If a meter gets gummed and sticks—does not work free—what is the best remedy, without bad results to the meter?*"

"*Do meters, when out of order, work in favor of or against the gas company?*"

"*What temperature will a meter work best in, giving best results to all?*"

The Secretary—In answer to the second question, I believe it is almost the universal experience that meters, when out of order, register against the gas company.

The President—Our consumers, I think, have an opposite opinion, and if there is any good ground upon which we can make this answer to that question I think we ought all to have just as much fortification as we can get. I presume each one works in his own way to that end. I hope this question will be discussed thoroughly.

Mr. Graeff—I think the only official record we have in this country is that made by the Massachusetts Commission which gives this answer—the answer made by the Secretary. I think the report showed that the meters worked slightly against the company.

The President—That, of course, is something we can place implicit confidence in.

Dr. McFadden—I think that every State inspection shows that the meter, when out of order, registers in favor of the consumer. There is one thing I would mention. Of course, no gentleman expects to carry his watch beyond 12 months without examination for repairs and cleaning. Meters cannot get that attention. With 30,000 or 40,000 meters in a city, in a large place, they cannot receive that attention which you give to your watch. But for accuracy of registering I don't think there is anything in the world to-day that is measured more accurately than gas. There is not a meter leaves a factory that I know of that does not leave it under a sworn inspection. If any gentleman will place before his mind 1,728 cubic inches, and vary it 2 per cent. above or 2 per cent. below, and place those three blocks before him, I don't think he could select which was the 1,728 inches—the difference is so slight.

Mr. Penn—My experience is that it has been against the gas company all the time. In testing meters, once in a great while you will find one that registers a little bit fast. That is a sure thing. There is one thing I can't understand about meters. We get a new meter and the customer will quit using it and go away for a short time, and when he returns and tries to start it his gas won't work. It is dead. Yet it is comparatively a new meter. I don't see why it should be so. I would like the meter men to explain that. If it was an old meter it would be a different thing.

Mr. McFadden—I would like to know if the meter registered at all after setting.

Mr. Penn—It registered when it was first put in.

Dr. McFadden—In transit meters are liable, as other things, to accident; but it is very rare that we hear of accidents in transit. It is remarkable that so few are injured by transit, but some are. It may be set and started and this injury received in transit may become apparent afterwards. I think it comes back to a question of a deposit upon the valve, evaporation taking place by the non use, it becomes sticky and gummy, and the valve of the meter does not work right, or, if working, it leaks; and just in proportion to that leak so is the loss to the company.

Mr. Persons—The only remedy for a meter in that condition is for the valves to be cleaned. Send it to the shop and have those accustomed to that work do it.

Mr. Penn—Do I understand it is the valve that sticks, or the diaphragm?

Mr. Persons—The valve—a gummy substance forms on its face.

The President—I don't know who proposed the second meter question; but it would seem to be in the mind of the writer of the question that a remedy could be applied apparently without taking the meter away.

Mr. Persons—I think I just answered that question. I don't know of any remedy except to have the meter repaired.

The President—You answered in that way, but I apprehend the writer had an impression there might possibly be another remedy.

Mr. Persons—When you send a man out to repair a meter he usually shakes it first, and if he succeeds in loosening the valve there will be a ridge left on the face of it which would make the valve "rock." It would pass gas and register against the company. It is not safe to do it. It ought to be sent to the shop.

Dr. McFadden—I think one of the important elements in the use of a meter is thorough purification of the gas. Prevention is easier than cure. We all know, for instance, that is, all who have had experience in the management of gas works—at least such was my experience—that gas not well purified is very offensive. Skunks are certainly sweet alongside of it. I have no doubt that if gas was thoroughly purified that meters would last longer and work more accurately.

Mr. Printz—While on the question of meters I would like to ask Mr. Evans if he finds any more trouble with the use of blue gas—that is, do the meters give out any sooner in using blue gas than with the ordinary illuminating gas?

Mr. Evans—I do not think we have any more occasion to repair the meters in using the blue gas than we would with coal gas. During some 8 years' experience in the distribution of fuel gas I knew what it was to have to repair meters, but I think there is no danger to be apprehended

from that direction at all. I know that in passing the unpurified gas as we did at Lynn through meters, it acted upon them very quickly. In fact I have known a meter to be perfectly useless inside of six months.

The President—This question as to temperature has not been brought out. It would involve somewhat the best location for a meter.

Dr. McFadden—In answer to the question of temperature allow me to say this: The same law that applies to the human organism applies to all things in nature. We doctors speak very frequently of the vicissitudes of temperature and their influence upon the human organism. Every gas man knows, and my gas experience taught me, that we might run a retort to the melting point without its cracking or leaking, but we could not afford to freeze it without breaking it. Now, meters should not be placed where hot steam would strike them. It has an injurious influence. It contracts the diaphragm, and extracts the oil; and I should say this, that every man is best in an even temperature. He don't want a change of 20° degrees in 24 hours, either up or down; and so with meters. The meter should stay at an even temperature. The best location is the cellar, away from the heater. So that a medium temperature for man or meter, is a good thing.

The President—The 9th question is, "*Is not illuminating gas, of the requisite candle power, sold at a reduced price for fuel, the true solution of the fuel gas problem?*"

Mr. Graeff—This is a question that will take about 5 years more to work out.

The President—I don't suppose it will be solved right here. There may perhaps be some views that members might like to express which we would all be glad to hear. If no one has anything to say upon that we will pass to the next question, "*Which is the correct method of tapping mains, on top or at the side?*"

Mr. Printz—I would answer that question by saying tap on the sides, for two reasons. One is that you don't weaken your pipe by a side tap as you do on top. Another is, if there is any stoppage you can clear your pipe easier by having a straight line than running it out and down with an angle.

Mr. Hyde—That is exactly the opposite reason given by our Mr. Heath why he would tap it on top. He taps on top. He would not tap on the side, and if there is any water in the main it doesn't run out on top while it might on the side.

Mr. Evans—Mr. President, I believe the top of the main is the place to tap them. For instance, if tapped on the top, there is always room to swing your service pipe in any direction you wish. If tapped on the side it is rigid.

The Secretary—If a second-hand opinion will be of any interest, I will state that I asked Mr. Felt, the Superintendent of Distribution of the Cincinnati Gas Light and Coke Company, what his opinion was as to this question, and he said it didn't make a particle of difference, according to his experience, whether the main was tapped on top or side. (Laughter.) He said it depended altogether on the depth of the main. If deep, tap on top; if shallow, tap on the side.

Mr. Evans—I have always noticed that they begin to excavate for the service about the same time they dig down for the main, getting the trench all open at the same time, then the workmen take hold of the pipe, pull it around so as to get it in line, and in a great many instances strip off a portion of the thread.

Mr. Printz—I admit there is a freer chance to swing your pipe sideways, but don't you meet with the same difficulty up and down if you tap on top? You have your elbow in there. Now, we don't think of making a tap in the pipe until we have the trench long enough, so that we can drop in a straight edge with a level in it, and get the proper elevation.

The President—To my mind the top of a main is, all things considered, the preferable place. Doubtless there are many instances where convenience might dictate otherwise. I have no doubt that any gentleman here who has had any practical experience in laying service pipes could refer back to his own experience and find examples of both practices. But, as has been stated, it seems to me that the tapping on the top of the main is, on the whole, the more economical plan, and the more convenient, as well as probably removing some difficulties in the way of disturbances. There is a little item of elasticity in the elbow connection that does not exist in the direct side connection. Perhaps that does not account for much.

Mr. Penn—I don't think I could tap on top at all in our town. Our mains are only about 30 inches deep. We could not get under the curbing at all; hence we use the side tap.

A Telegram.

The Secretary—The President has suggested that I now read a telegram received from Mr. Emerson McMillin, whom you yesterday elected to honorary membership. The telegram is as follows:

"To Irvin Butterworth, Secretary Ohio Gas Light Association.—I never accepted an honor with greater appreciation than the honorary membership in the Ohio Gas Light Association. Present my compliments to the President and members, with my sincere regrets that I cannot be present at a meeting of one of the best working Associations in existence.—Emerson McMillin."

The President—There is also a little routine business that should be attended to now. There are three committees to hear from. Is the committee on nominations ready to report?

Mr. Cantine, on behalf of the Committee, reported the following nominations:

For President and Vice-President, Chas. R. Faben, Jr., and N. Wilkiemeyer; *for Secretary*, Irvin Butterworth; *for Treasurer*, O. P. Taylor and Geo. W. McCook.

We also suggest that whichever candidate (Mr. Faben or Mr. Wilkiemeyer) receives the highest vote shall be President, and the other shall be Vice-President. We would suggest the propriety of electing Mr. Butterworth by acclamation, and of voting by ballot for all the other candidates.

Mr. Wilkiemeyer—Allow me to make the suggestion that we cast the unanimous vote of the convention for Mr. Faben as the next President of the Association.

Mr. Cantine—That is a piece of magnanimity on the part of the gentleman making the motion that he will hardly be entitled to exercise.

Mr. Wilkiemeyer—No, sir; I certainly have a good running mate, and I want him to come under the line first.

Election of Officers.

Mr. Alexander—I move the rules of the Association be suspended and that the Secretary be instructed to cast the ballot for Mr. Faben for President for the ensuing year. (The motion was seconded, put and carried.)

Mr. Graeff—I make the same motion in regard to casting the ballot for Mr. Wilkiemeyer, for Vice President. (The motion was seconded, put and carried.)

On motion the President cast the vote of the Association for Irvin Butterworth for Secretary.

A ballot was then taken for the election of a Treasurer, which resulted in the election of Geo. W. McCook. On motion his election was made unanimous.

Report of Committee on President's Address.

Mr. Printz, from the Committee on President's Address, made the following report:

The Committee on President's Address have carefully considered the very valuable suggestions offered, and, in as forcible a manner as possible, would ask the members of the Association to carefully read and work out these suggestions, in the course of the year, to the very best results.

One suggestion in particular should be acted upon at once—*i. e.*, as to the Legislative Committee. This Committee should have definite instructions. It should closely look after all interests appertaining to the welfare of the gas industry, and give its attention to difficulties as they come up, and as they are brought before it. The expenses which this Committee may incur in the fulfillment of its duties should be paid by the Treasurer out of the funds of the Association. As to the scope of its powers the Committee alone should be the judge.

Respectfully submitted, Eugene Printz, H. Wilkiemeyer, } Committee.

Mr. Matt—I move that the report of the Committee be accepted and made a matter of record.

The President—Gentlemen, the report of the Committee is before you for your adoption or rejection, and I trust you will give it as careful consideration as the circumstances may permit. Are there any remarks?

Mr. Printz—Mr. President, Mr. Foote is here. He has given this matter considerable attention, and I would like him to make such remarks as he may feel disposed respecting this question.

The President—I think, perhaps, we had better dispose of the other matter first.

Mr. Printz—I think the information he would give us would probably assist us in determining what disposition we should make of this matter.

Mr. Wilkiemeyer—I think it would be best to discuss this question somewhat. It may be possible that we do not see the need of this Legislative Committee. Now, if we are better informed as to our needs, we may come to some definite conclusion. It is something that requires

thought, and then as we understand each other, the different members of the Association will know what best to do. I think Mr. Foote could give us a very good idea of this subject.

The President—A motion is before the house, but the vote thereon may be foregone, if there are no objections. As I said before, I had a desire to listen to Mr. Foote, and am glad to see him present. Mr. Foote, as you all know, is Chairman of the Committee on Legislation, of the National Electric Light Association. If there are no objections to deferring the vote upon this question, we will defer it, and I will invite Mr. Foote to make some remarks upon the subject of municipal control.

Mr. Rood—The motion before the house seems to be to receive the Committee's report and place it on file. This does not prevent us from afterwards taking up that report and discussing any recommendations they may make. It seems to me that it would be entirely proper to receive the report and then hear from Mr. Foote, or any other gentleman, upon the recommendations of the Committee.

On motion the report of the Committee was received and placed on file.

Mr. Foote, on invitation of the President, then made the following remarks:

Mr. President and Gentlemen:—Perhaps I can serve you best by offering an outline of my connection with this subject of legislation. A year ago, at the convention of the National Electric Light Association, the question was discussed of the municipal ownership of electric light plants. As a result of the papers read at that time a resolution was adopted creating what we term the "National Committee on Legislation," of which I was made Chairman. No instructions were given to that Committee. I was authorized to appoint one member for each State in making up the National Committee. The first object in view was to collect from each State all the bills that were offered in the Legislature of the State, and the discussion had on them, with a view of having them ready to be used in any other State. The plan of work as laid out was on this line—that I, as Chairman of the National Committee, should be furnished from each State with copies of all the bills that were introduced in the Legislatures, and the discussions had on them, with the objective point of having them ready to transfer to any other State where a similar question would come up, so that we would not be constantly threshing out the same old straw in the attempt to get at least some of the questions settled. As soon as we commenced to look into the subject we found there was a very great difference in the laws of each State, between the statutes touching the questions governing electric central station companies; that is, the general question of franchises, rights and powers of local councils over the action of the Company; the way of fixing prices; the way of making up contracts, and all these questions. In fact, every question of legislation that affects a central station company is either a question of State or municipal legislation. In order to unify the electric interests so they could work for their State, we instituted a movement to organize State associations. The membership of these State associations is confined exclusively to operating companies, and they are supposed to look after the legislation in their own States, being assisted in their work through the work of the National Committee. There are 10 or 12 of these State associations now organized. There were 10 in February. So far as the policy of having a Committee on Legislation is concerned, I hardly think there can be two questions about it. All this subject of legislation has to be gone through with by every company, more or less, in some phase or other, every year. The experience that is gained is what you might term a bye-product that you now let go to waste. A company has a struggle with a local council over a question of renewing a contract, over a question of price, or something of that kind. When that comes up, if they have not the means of laying their hands on the information that had been brought out in similar struggles elsewhere, they are at a disadvantage. These questions occur all through the United States. If the company having a case in hand would make a record of its own case and transmit that record to the Committee on Legislation, in the course of time the chairman of that Committee would be in possession of data and facts and arguments that would meet any case that would come up, because there is a very great similarity in these cases. They follow a certain rut. To give you an illustration: Last Saturday I received a letter from a certain gentleman saying a town meeting had been called to take a vote on establishing a municipal plant, and wanted all the information he could get on the subject. I was able to send that party pamphlets containing the arguments made in four different States on that subject. At the cost of 25 cents for postage I furnished him arguments that would have cost him $500, if he had to pay for them. They really cost more than that in the first place in attorneys' fees. I simply state that to show you the workings of this Committee. It can be carried on with very little expense, and to very great advantage. So far as giving instructions to the Committee is concerned, I do not think the Committee need any instructions. I think the general understanding is that the Committee is to take cognizance of all questions that affect your interests in the line of legislation, whether that legislation be municipal or State. Any one of you having a case in hand should report it to the chairman of that Committee and advise, work with and aid him—the State Committee becoming a sort of a Committee on arbitration between each company and its local authorities. That is the outline on which we are working. Of course the work is still in its infancy. We have not accomplished very much, and still we have got sufficient results from it now to know its value.

So far as the question of municipal ownership is concerned I think there is more agitation going on and more work being done in the direction of trying to institute public plants than most of you are aware. All of the professors of political economy, so far as I know, of the universities, are favoring that issue—some to a greater and some to a less degree; but I think they all favor municipal control as a proper economic measure for the people; and, so far as I know, every professor of political economy who favors municipal control also favors free trade.

Last week I received a letter, from the Secretary of the Board of Transportation of New York city, that has in it quite a full detail of that city. They wanted all the data I could give them on the subject of municipal control of electric light plants and gas plants. I judge this information is being collected to favor the ownership of these plants by the municipalities. Of course, you are all aware of the extent of the Nationalist movement in that direction. They have clubs now in almost every State, and in almost every important city in the States. They are devoting their entire work to that line of development. They are making the move now to introduce a petition in the Massachusetts Legislature, with 200,000 signatures, asking for a general law of that State, authorizing the towns to erect gas and electric light plants. They have a petition before Congress to have the District of Columbia authorized to do so. They are working it in Cleveland. They are working the same thing in Minneapolis; and so all over the country that movement is being carried on. It is a very popular movement, of course, among the wage earners and laboring poeple, and it will spread and have a great deal of influence. I think the best way to meet that question is through State organizations. I believe to-day that the condition of the electric light and gas companies of Massachusetts is in better shape, and that they are better prepared to meet such issues than in any other State in the country, on account of that State Gas Commission; and, personally, I favor the creation of State Gas Commissions and Electric Light Commissions to take control of that subject. I don't know how familiar you may be with the Massachusetts law, but the short of it is that it creates a commission of three men, with a clerk, to devote their entire time to the work. They act as a Board of Arbitration. If there is any dispute between the local company and the local authorities either one can appeal to this Commission as a board of arbitration, and the decision of the board is final. They set themselves against rate competition, and against competition in the business. Where there is one company in a town, and that company is in shape to perform the service in that town, they do not give their permission to any other company to enter into business in that town. That is, in my opinion, a sound economic condition, and I think you could do no better than to institute your committee on legislation, and simply give them general instructions to look after your legislative interests in every detail and every particular. Then you must remember that they can do nothing whatever unless you cooperate with them. If each company in the State should send to the chairman of that Committee every case that is brought against them, every complaint they have to make, and every complaint that is made against them, with the action taken against them, so that the matter can be made a matter of record, so that it can be preserved and used, in the course of time you will have something that is very valuable to you indeed. It will be a record that will be satisfactory to any legislature or any council, or any board of fair-minded business men competent to examine such questions. I am obliged to you for your attention.

Mr. Graeff—Mr. President, I would like to ask Mr. Foote to give us some outline, if he will, of the manner in which these State associations of electric lighting companies work. It is very probable that it will become expedient, in the eyes of this committee of ours, to recommend the formation of some similar association of the gas companies of this State. I would like to ask Mr. Foote to give us an outline of how these State electric light associations work, so that we may be familiar with it in case the question should come up.

Mr. Rood—I would say a State association has been formed of the electric light men in Ohio, and the organization met last week in Col-

umbus. Hence the electric light people operating plants in the State of Ohio, independent of gas companies and with gas companies, have an association and also have a committee to look after legislation. It was brought about because there was legislation proposed before our Legislature that was going to do a very serious injury to electric light companies, if allowed to pass.

Mr. Graeff—Yes; this State association is simply one of the associations formed under this National Committee, of which Mr. Foote is Chairman. There are 10 or 11 others through the country, and I wish Mr. Foote to explain that plan for the benefit of the gas companies.

Mr. Foote—They are all on a uniform basis, as they admit to membership only operating companies. If a gas company is operating an electric light plant, it is admitted to membership. The tendency has been to make the initiation fee very small. It runs from $5 a year to $20; I think it would average $10. To enable a company to become a member of the association an act of the company would be required—a resolution passed by its board of directors—then any member of that company, any officer or regular employee of the company, can represent the company in a meeting of the association. In fact, all the officers and all the employees of the company, if they choose, can attend he meeting; but they would have to designate some one of their number to cast the vote for the company, so that there would be but one vote by each company. To provide for the finances, an assessment is authorized to be made, which varies from one-eighth to one-fourth of one per cent. of the capitalization. In the State of New York, however, that is changed to $1 on each horse power employed by the company. In case a gas company is a member, the assessment only applies to that part of its investment which it is using in the electric light business. This assessment is subject to the order of the executive committee of the association. So it gives them the means of raising a fund, if they have use for it, without waiting to call a meeting of the association, or without much delay. They can simply have a meeting of the executive committee, order an assessment, and collect the funds. So far as my observation has gone (and I have been present when eight of these associations were organized), there has been no disposition at all to hold back in the matter of finances. A proposition was made in the State of Massachusetts of making the assessment one-eighth of one per cent. Forty companies were represented at the meeting when the organization was effected, and authority was given the executive committee to raise this assessment from one-eighth to one-sixth of one per cent. by people who had not been what might be called workers of the association—showing that it was popular, and not brought about by those who had been instrumental in bringing the association into existence. You will see that varies somewhat from your Ohio Gas Light Association, because you admit members who are not engineers, but manufacturers, and who have interests other than the simple, direct interest of producing gas with profit from a plant. We are now considering a move to bring all these State associations into federation as a National association. That will be our next step, which will be considered during the next six months. We propose to continue the work of organizing State associations until we get a State association in every State, and then probably we will follow the line of the State commissions as being our best protection in the matter of legislation. That matter, however, has not been brought out before the association in any way for public discussion.

Mr. Rood—In what respect do the laws of Connecticut and Massachusetts differ?

Mr. Foote—Well, I can't answer you technically. Massachusetts has control of the companies through a commission which gives each company protection in its town against any infringement from an outside company—what we call "raiding companies." If I am rightly informed, in Connecticut any body of people can go to its Legislature and get a charter to do business.

Mr. Rood—A charter would have to be gotten through the Legislature instead of the State officers.

Mr. Foote—Yes, sir; I think so. I have a copy of the law under which the Massachusetts State law is operated which I could read, that would give you full outline of the points that we are talking about.

Mr. Evans—I would like to ask Mr. Foote if this power given the Gas Commission of Massachusetts to prevent the introduction of any other company into a city where one is already doing business has not been very recently conferred on them. I was not aware they had any such power.

Mr. Foote—The Act creating this Commission was passed in '85, I believe, and it has been amended several times. I can't tell whether this power was conferred by the original Act or whether it is an amendment; but it gives them supervisory power.

Mr. Evans—I was aware they had considerable power over the gas companies, some of which is a little expensive to the companies. For instance, every gas company there is obliged to keep its accounts according to the form devised by the Gas Commission. They must show in detail on these accounts every pound of coal and every gallon of oil they use, every pound of coke they sell; in fact, every expense in detail must be shown, including the salaries of their officers and the dividends. It makes public the company's business all over the State. All you have to do is simply to get a report of this Commission, which anybody can get by writing for it. I have written for it myself and received it. So that it not only makes your business public throughout the State, but all over the country, for that matter. I understood their power consisted only in obliging companies to manufacture their gas within certain limits, as to a certain per cent. of carbonic oxide that was allowed, a certain amount of sulphur and ammonia, and a certain standard of illumination.

Mr. Foote—I think that 90 per cent. of the companies in Massachusetts, if asked to-day, would say that the Gas Commission is a very great benefit to their business, and they would prefer to see it continued rather than discontinued. That is the information I have from those in that State whom I have come in contact with.

Mr. McDonald—I think, Mr. Chairman, that Mr. Evans is slightly mistaken. The matter he speaks of in regard to carbonic oxide, ammonia and sulphur, are matters of law in the State of Massachusetts. They are, possibly, in some measure under the control of the Commission; but these are matters of State law, and were established before the Commission was established. They are now agitating in the Legislature there a law which will permit of more carbonic oxide in the gas made than is now allowed in Massachusetts. I only speak of this to correct this misapprehension which he had in regard to where these limitations came from.

Mr. Graeff—Mr. President, I think that the Massachusetts law originally covered what it covers to-day in regard to the admission of new companies.

Mr. Evans—I don't think so, Mr. Graeff. I had occasion to look up the matter quite thoroughly when I was in Massachusetts.

Mr. Graeff—I know the Commission is popular to-day among the companies of the State, so far as can be gathered from talking with members from all sections of the State. I think Mr. Foote is right in saying that 90 per cent. of the companies would vote for the continuation of the Commission, but I understood that these electric light State associations were simply for the purpose of attending to the matters of legislation, and not for the discussion of all questions, such as our gas Associations discuss. Is that correct, Mr. Foote?

Mr. Foote—No, sir; not strictly. The legislative point is the "exciting cause," but where we create an association, the association is competent to do any business of interest to the companies in the State.

Mr. Evans—I understand that a petition signed by 20 consumers of gas of any town or city presenting this petition to the Gas Commission, claiming that your gas is of inferior quality, or that you are charging too high a price, can be acted on by this Commission, and that this Commission has power to compel you to reduce your rates.

Mr. Foote—That is true; yes, sir; and the record is that the power has never been abused to the disadvantage of the gas company.

The Secretary—Mr. President, I have given this subject no particular thought, but it occurs to me that for our present purposes the adoption of this recommendation that the committee on the President's Address has made, would be sufficient; that is to say, the appointment of a Legislative Committee that will perform such duties as the Committee on President's Address has suggested; and as Mr. Wilkiemeyer, of that Committee, mentioned apart from the report, viz., to take into consideration an association of companies rather than individuals, and make a recommendation at our next meeting, if such a thing is desirable. I think the adoption of such a plan as that would be sufficient for our present needs.

Mr. Rood—I am of the opinion that the adoption of the Committee's report would be a good thing for the Association. I think their report and recommendation are in the right direction, and I move you that we now adopt the Committee's report. (The motion was seconded.)

The President—Gentlemen, it is moved and seconded that we now adopt the Committee's report.

Mr. Hyde—Mr. President, it seems to me that there should be some limit as to the expenses. One question would be, "How much funds have you got, and how much latitude should we give this Committee?" If they are given unlimited authority, of course, we would naturally suppose they would be judicious in expenditure, but it seems to me there ought to be some understanding, some suggestion, as to the amount of

money that should be expended in carrying out this purpose. Now, it seems to me that it would be well for this Association to investigate and appoint a committee to report at the next meeting; but it does not seem to me they should have authority to attend to this matter in a sort of uncertain manner, according to their own judgment. It seems to me it would be all right for them to prepare a plan and recommend it to the next meeting that could be recommended to the gas companies. It seems to me that this business should be done with the gas companies—that there should be an association of gas companies' representatives. We are not strictly gas companies' representatives, only in a sense; but I don't think we should do anything more than to prepare a plan. Let this Committee prepare a plan, and then, when it is arranged, recommend it to our gas companies, and let our gas companies do anything or not, just as they please. I don't care whether they do or not. I have no interest in it. It is for our companies to do it. Whether our company does it or not is of no consequence to me. They don't send me here, and why should I do anything? I expect that is the case with all of you. You are not sent here by them. You might suggest a plan and recommend it to them, and if they say "We will operate under it," that is their business, not ours. That is my view of it.

Mr. Graeff—I think every member of a gas company here, every engineer or manager, has a direct interest in this matter, and I think this resolution is perfectly in order for adoption from that standpoint—looking to the protection of the interests which we have in it. Of course a committee of this character cannot undertake to combat adverse legislation as can a State association formed by the companies themselves. In the first place, that would require an expenditure of money which this Association could not dream of. But our committee can go ahead, as Mr. Hyde says, to perfect (and possibly go a little further than simply laying) plans, and putting them in shape so they can be carried out by the gas companies of the State, or whatever authority chooses to take hold of the matter; but I think the continuance of this Committee would be possibly the best thing this Association has done at this meeting.

The Secretary—Mr. Graeff, don't you think it would be well to limit the amount of expense that this Committee can incur?

Mr. Rood—If you will allow me to suggest, I think you can overcome that difficulty by inserting "subject to the approval of the executime committee" of your Association.

Mr. Foote—In my work I have to spend money and then get it appropriated afterward; so they have a pretty good hold on me. I always bring in a bill for what I spend.

The Secretary—A motion to adopt this report in full is before the house. I move that we amend by inserting the words "subject to the approval of the executive committee," in reference to incurring expense. (The motion was seconded.)

Mr. Rood—Mr. Chairman, as the mover of that motion, I will accept that amendment.

The motion, being then put before the Association, was carried.

Mr. Rood—Mr. Chairman, who are the Committee named?

The President—As I understand the action of the meeting at Mansfield, the Chair was empowered to appoint two members of that Committee, and the President who followed afterward furnished the third member. The third member of this Committee is now already appointed, and it only remains for the present Chair to appoint two other members. The Secretary tells me that that rule was adopted for future action, or until it should be rescinded. In the absence of any objection to that course I will announce two members of the Legislative Committee that are to be appointed by the Chair. They are Mr. A. J. Stull, President Gas Light Company, Sandusky, Ohio, and Mr. H. Wilkiemeyer, Secretary and Superintendent Gas Light and Coke Company, Portsmouth, Ohio. These were both members before, I think are very able men, and as well qualified as any appointees that could be made.

Back to the Question-Box.

We will now discuss the 11th question:

"*Is the Welsbach burner with natural gas a success, and what proportion of the lighting does it do in towns having both natural and artificial gas?*"

Mr. Graeff—Mr. President, I think we have a couple of representatives here who can tell us what success the burner has made with natural gas. One of them is Mr. Hunt.

The President—We will be very much pleased to hear from Mr. Hunt.

Mr. Hunt—Mr. President, we are making some progress in Pittsburgh. We have 12 or 14 thousand there in use, all giving fair satisfaction. In Muncie we have about 6,000. In Findlay we have about 1,500, I think. So far they have given very good satisfaction, and we have them in some smaller places in Ohio where they have got artificial gas. I think the number of Welsbach lamps in use altogether is something like 75,000—that is, on both artificial and natural gas. In the city here we have an exhibit of Welsbach burners consuming natural gas on about four ounces pressure.

Mr. Graeff—What candle power do you consider those lamps as giving, and how long will they keep that candle power?

Mr. Hunt—I think that candle power is not less than 35, and the lamps will last not less than 750 hours, and will maintain that candle power not less than 250 hours; at no time dropping down to less than 25 or 28-candle power.

Mr. Graeff—How many have you at Indianapolis, do you know?

Mr. Hunt—I think about 6,500 now. The business has reached such proportions there that Mr. Fletcher has expressed himself as interested in the plant, and I think has made some sort of a proposition for us to join in interest with him, or take some part in the business.

Mr. Graeff—Mr. President, I would like to ask Mr. Hunt what is the standing of this light in Mr. Fletcher's estimation? I understand Mr. Fletcher made an offer of $20,000 for the right of the Welsbach lamp for Indianapolis. Is that correct, or can you answer the question?

Mr. Hunt—Those are secrets; but Col. Barrows wrote me some time ago, when a question came up as to the success of the Welsbach light, as to whether there was any possibility of doing business in Toledo. I explained the business to him, whereupon he said the business had reached the point in Indianapolis that Mr. Fletcher had offered them a handsome sum of money for an interest in it. Mr. Graeff's figures are not far out of the way. We have been working like heroes to introduce the Welsbach, and are meeting with very gratifying success.

The Secretary—How much longer do your lamps last with artificial gas than with natural gas?

Mr. Hunt—With the uniform pressure of natural gas I think the life is about the same. I made that statement, applying it to both natural and artificial gas. In Findlay, where we have a pressure varying from 8 to 20 ounces, the mantles last 500 hours. We get pressures there all the way from 8 ounces to 10 pounds.

The Secretary—How many Welsbach burners did you say you had in Pittsburgh?

Mr. Hunt—There are about 14,000 in use, I think, now.

The Secretary—How many employees are necessary to keep those in order?

Mr. Hunt—Well, I think a force of about 8 to 12 men, including the bookkeepers.

Mr. Rood—At Findlay, Mr. Hunt, what has been the position of the Welsbach burner as compared with incandescent light? Are you displacing the incandescent, or are both the Welsbach and incandescent lights growing?

Mr. Hunt—At a meeting of the Westinghouse Company in regard to the Allegheny business the statement was made that the Welsbach light was causing them a great deal of trouble and displacing a great many lights.

Mr. Rood—What is the condition at Findlay?

Mr. Hunt—At Findlay the incandescent people have made the price as low as 33⅓ cents for not less than 12 lights, and there they have procured some business.

Mr. Rood—How many incandescent lights have they there, probably?

Mr. Hunt—Not over 250 altogether. Their arc lighting business is a very handsome and profitable one, and increasing all the time.

A Member—Mr. President, I would like to ask Mr. Hunt if the burners are sold to consumers, or whether they are simply rented to them? As I understood, in questioning some consumers, they bought them for so much a burner, and natural gas was furnished by the Welsbach Company—the Welsbach Company supplied the burner, and they were paying for the Welsbach burner 15 cents per lamp per month.

Mr. Hunt—Mr. Stevens, from the Pittsburgh office, can answer that question more intelligently than I.

Mr. Stevens—We have two systems. In Pittsburgh we rent the lamps to our consumers. There are two kinds. Part of them use gas by meter and part of them by contract—we have it so arranged that they can use it through their meter. We have enough to do without it, and they don't pay us for the gas; but, if they are using the meter and wish to rent our light and have us furnish the gas, we will make connection behind the meter and furnish gas, too. To show that it is no "gouge" game with us, I put on, say, 24 lights, and put a meter in the house. We assume that our light will use or consume 1,500 feet of gas in a year. I put on 24 lights, and in a year they burn about 25,500 cubic feet. So that with the use of natural gas such a small amount is hardly taken into consideration.

Mr. Evans—How much does each burner burn?

Mr. Stevens—2½ feet with natural gas. Of course if the gas runs up to a higher pressure I suppose it would use a little more; the average on natural gas is about 3 feet, I think. I have made several tests on different occasions, and found it to run from 2.7 to 3.1—so I always say 3 feet. I also think I am giving a maximum estimate.

Mr. Rood—Do you sell or rent the burners?

Mr. Stevens—In some towns we sell them. In giving contracts to companies we grant them the privilege of renting or selling, as they see fit. The Pittsburgh department is run by our own Company, and therefore we rent the light. In some towns in Ohio the business is run by the Gas Company, and they rent the light. It lies with the company handling the light whether they will rent the burners or sell the light.

Mr. Evans—Is not it a fact, Mr. Stevens, that in Fort Wayne, Ind., they also have adopted that system of renting each burner at 15 cents a month and keep it in order; also that the Welsbach Company furnishes the burner to the consumer, and charges him 15 cents per month per burner, and keeps the burner in order?

Mr. Stevens—Well, I don't understand it that way. I think Mr. Hunt can answer that.

Mr. Hunt—I think the customer makes his own arrangement, paying 35 cents for the mantle, 5 cents for the chimneys, and 20 cents for the shade. The 15 cents is simply for rental.

Mr. Smith—That differs according to localities. In our place they charge 50 to 60 cents. The Company have represented to me that they were the agents.

Mr. Stevens—I would answer that question in this way, where companies take hold they cannot sell the mantle for 35 cents unless they make their rental plan in some way to make it up. The burner cannot be produced for less than that amount of money.

Mr. Rood—What is the price usually charged by the Welsbach Company to gas companies using the burner?

Mr. Stevens—Thirty-five cents. If a company starts out to rent its lights it has to make the rent high enough to cover its percentage on that mantle, because they pay 35 cents for it. They do that in Pittsburgh. That department there (I am not directly connected with it) rent their lights at so much a year. They have a schedule which covers the amount which would give a percentage on the mantle. They furnish the mantle in Pittsburgh for 35 cents, but they are getting a percentage on that mantle in the schedule they make. Where you sell the lamp outright to the company handling the light they furnish the mantles at not less than 50 cents, because it would not pay to handle them for less.

Mr. Rood—As a rule, though, the consumer pays for all the broken mantles or the renewals?

Mr. Stevens—Undoubtedly; you wouldn't expect the Company to buy the material and then give it away to consumers.

Mr. Graeff—Mr. Hunt, at Indianapolis the rental there covers what? Now, I got a schedule that the Indianapolis Company published last month. The schedule ran down, I think, to 50 lights per month, costing $17.

Mr. Hunt—I think that includes rental of the light and the cost of the gas. I can tell in a moment by looking at the schedule.

Mr. Graeff (reading)—"Per month, 50 lamps, $17.50." What does that cover?

Mr. Hunt—That covers the entire cost of the light there. I think they have figured the gas and mantles in that.

Mr. Graeff—I judge, Mr. President, that was an opposition schedule to the electric incandescent.

Mr. Hunt—That is a fact.

Mr. Graeff—I think that has been created to compete with the incandescent electric lamps in wholesale quantities; therefore, that must cover everything. Of course, incandescent electric lighting covers everything, and this must cover everything, including shade and mantle.

Mr. Hunt—Yes, sir; and where there is a uniform pressure mantles last a satisfactory length of time.

The Secretary—I would like to ask Mr. Stevens if, at Findlay or Indianapolis, where a room contains a great number of Welsbach burners consuming natural gas, there is any complaint from unpleasant odors produced by them.

Mr. Stevens—Well, now, I don't know with reference to Findlay. There is a difference, as you all know, in natural gas. At one place we find that the natural gas has an odor, while at another it has none. Mr. Hunt made a statement about the life of a mantle. I believe that the gas in his field (the northwestern part of Ohio) is far harder on the life of our mantle than the gas in the other parts of Ohio and Pennsylvania. In my travels around (and I am "around" pretty nearly all the time), I find in one field that the mantle will run, on an average, from 1,000 to 2,000 hours. Then I will strike another field where they will not run that length of time. It appears that in this field the gas has more sulphur substance in it. That will eat away the mantle. I found some of this trouble with it in Newark, Ohio, but I overcame that by several manipulations. There the mantles run very well now. The gas is not the same there that it is here—not as hard on the mantles. When I go further I find it still better. I find in some places a natural gas that you can run the mantles on as long as with artificial. I have run mantles for a year without touching them. I can give names of parties who have used them that length of time, and I can also give names of parties who have used them for 2,000 hours. I don't say that our mantle will always run that length of time; but it has run that length of time. It is a delicate thing, of course, and very easily broken. I admit all that; but with judicious management it is a fair estimate to say that the mantle will run 500 hours.

Mr. Rood—What is the shortest time you have known mantles to run?

Mr. Stevens—I have known them to break inside of 10 minutes.

Mr. Evans—What percentage break in 10 minutes?

Mr. Stevens—It would be very small.

Mr. Evans—What I want to get at is the liability to fractures—whether one has to use extraordinary care in handling or lighting them?

Mr. Stevens—Not after they are first started. I consider the mantles should be properly put on. I think a great many mantles are destroyed from not being properly handled, in the first place. To get the best results out of a mantle, I know from long experience that it should be started and tempered slowly at the outset. Then we will get a good result from the mantle. It is a good deal like taking a child and starting it. You have to take it gently at first.

AN INTERJECTION.

The President—I don't want to cut short this discussion, but I believe Mr. Faben is here. Mr. Faben, I would like to inform you of the exceeding satisfaction I have in saying that you have been unanimously elected President of the Ohio Gas Light Association, for the ensuing year.

Mr. Faben—Gentlemen of the Association, I thank you for the honor you have conferred upon me. At such a time it is usually fitting to make some pretty remarks, but we will have to forego that now. The Association heretofore has certainly been a useful organization—a voice: "That is so"—but that its usefulness has been as complete as could have been wished I question. The success of the Association does not depend entirely upon the officers, but does depend upon the individual effort of each member. We all come to the Association meetings. They are well attended. Good subjects are presented. The attendance is here. There is not a member present who has not his ideas and convictions on every subject presented. Yet they are very reticent about placing themselves on record. I do not say these things in a fault-finding sense; but, as your choice for President, I hope at our next meeting all those who have attended this will be present, and will come prepared to render every assistance possible, especially in the way I have suggested, in making the meeting as successful as the one just closing. I thank you again, gentlemen, for this honor.

The President—Gentlemen, are there any further remarks with reference to the Welsbach burner?

The Secretary—Mr. Hunt has called my attention to a letter that Mr. Phillipp, of Findlay, has written me, with reference to the Welsbach burner, which I will read:

"We have been using the Welsbach with natural gas about 14 months, and our satisfaction with it can best be expressed by the following resolution of our Board, passed August 28th, 1889: '*Resolved*, That the general adoption of the Welsbach light be made, owing to its excellence and its economy in the use of gas.' Also, in the rules and regulations for the use of gas, of January 2d, 1890: 'The adoption of the Welsbach light for manufacture is recommended by the Board.' This practical testimony on the part of the Board of Trustees is conclusive to the fact that the Welsbach burner has given entire satisfaction, both as to economy and quality of light. Very truly yours, E. B. PHILIPP,

Sup't City Gas Works, Findlay, O."

I wanted to say a while ago that as I had already given two or three second-hand opinions, I would also give one on this. A gentleman in Columbus noticed this question on our programme. His occupation is such as to indirectly interest him in gas, but he is not a gas man. He said: "I can answer that question"—he is a man of intelligence and observation—"I have been all over this State and Indiana, and the Welsbach burner, theoretically, is a success, but practically it is not." That is simply his opinion; it goes for what it is worth. I think myself

that the Welsbach burner is a success, in a measure. It will occupy a certain field, more or less limited, more or less extended.

Mr. Evans—I would like to be made perfectly clear on this matter. As I understand Mr. Stevens the life of a burner is during the consumption of 1,500 feet of gas, and that the mantle is supplied by gas companies at 35 cents apiece. In other words, that 23¾ cents represents the carburation of a thousand feet of gas. If I am in error I beg he will correct it.

Mr. Stevens—No; that represents the amount of gas consumed by the light.

Mr. Evans—I so understood it; yes, sir; which represented the life of the lamp.

Mr. Stevens—No, sir; when I spoke about the consumption of gas what I said was that our light would consume in one year 1,500 feet of gas—that is, in ordinary burning, house use. The life of a mantle has nothing to do with the consumption of gas.

Mr. Evans—I thought you had the thing so figured down that you could tell how long a mantle would last by the consumption of gas which was consumed by the burner.

Mr. Stevens—No, sir; you misunderstood me.

Mr. Evans—I think that represents 600 hours.

Mr. Stevens—I made the statement that our mantle would last about 500 hours, but I could produce lots of evidence that it would run 2,200 hours. That does not say that every mantle would run that long—nor can we say that every mantle would positively run about 500 hours; but I do not see any reason why they should not, and where there has been a fair and judicious handling of the light I have not seen a mantle that has burned out in that time. I have not been over this territory, yet, I believe, from what Mr. Hunt has told me about this gas, that it is stronger and has a harder effect upon our mantles than in other places.

Mr. Evans—Can you tell what is the average life of a mantle?

Mr. Stevens—Between 500 and 1,000 hours—700 to 750.

Mr. Evans—Why is it that they vary between 500 and a 1,000?

Mr. Stevens—The Welsbach people have spent several thousand dollars to find that out, and don't know themselves.

Mr. Evans—On the introduction of the burner into use, if you base your prices on that, I don't see how a gas company could figure satisfactorily.

Mr. Stevens—We cannot make any average of that except of the general life of the mantle, which is from 500 to 1,000. Of course, some times they run 2,000, and sometimes they come under 500. But as to the lamps lasting ten minutes, I think not one-half of 1 per cent. is that way.

Mr. Evans—I remember one instance where three out of six had to be removed inside of 20 days.

A Member—I experimented with two, one of which lasted 31 days and the other lasted 22 days. Each burned 4 feet of illuminating coal gas per hour.

The President—What constituted the day, Mr. Evans? How many hours?

Mr. Evans—Twenty-four hours.

Mr. Graeff—I have a dozen of them in my house that were put in there in the fall of '88, and the same dozen mantles are running there yet, with the exception of one which I undertook to run on a test, to see how long it would go without going to pieces. It ran 1,970 odd hours, when some ignorant assistant from the Welsbach Burner Company came up and put a new governor on. He thought that lamp was not looking quite as well as it ought to, and undertook to put another one on. At the expiration of that 1,970 odd hours I could read in the room, which is about 33 feet long, with the light on the opposite bracket. I could read at the extreme corner of the room, certainly 30 feet away from the light. That is what I said a year ago—that the Welsbach burner was a success (and I maintain it is to-day) on artificial gas. I don't know how it is on natural gas.

The Secretary—Mr. Evans, what are the results of any experiments that have been made with the Fahnehjelm comb in connection with the natural gas?

Mr. Evans—I do not think any success has been attained at all. I have made some little experiments, but they gave no satisfaction whatever. In one experiment I made with the Welsbach burner, in burning 4 feet of gas it showed on the photometer 19 candle power when first put on. The first one, at the expiration of 3½ days, showed about 3 candle power; while the other one, which lasted, I think, 22 days, showed between 4 and 5 candle power.

Adjournment.

Mr. Faux—Before we adjourn I move a vote of thanks be tendered the President for his efficient and courteous services rendered at this meeting. (The motion was put and carried.)

Mr. Hyde—I move a vote of thanks be extended to Mr. Butterworth for his very efficient services. (The motion was put and carried.)

On motion of Mr. Clark the convention adjourned.

Experience with Subsided Gas Mains.

[A paper read by Mr. Wm. Drewry (Cleethorpes, England), at the March meeting of the Eastern Counties Gas Managers' Association.]

The subject of this paper, happily, is not the every-day experience of gas managers; but there are times when all are more or less liable to subsidences of mains from various causes. In order to give you as clear an idea of my situation as possible, it is necessary to briefly describe the face of the country as it was supposed to be a long time ago, and also its present state.

First, its ancient condition. Cleethorpes was a small village, situated on the east coast of Lincolnshire, on a large clay cliff, one end of which is practically connected with the Wold Hills; far away to the west, the other end jutting far out into the river Humber, and almost directly opposite Spurn Point, on the Yorkshire coast. The next projection we find was Lock Hill, at Grimsby. Whether this was formed in making the old harbor or not does not affect my paper. It lies about three miles northwards. Between these two hills the coast line fell back landwards for a considerable distance, and thus formed a large bay; and a stream (with a gravelly bottom) flowed through it, and there is to be seen to day a sea bank, nearly a mile inland from high-water mark. Time and the action of the wild sea waves have gradually dismantled the beetling cliff, and carried it towards the bay, which, together with sand and gravel, have filled up and brought forward the coast line almost straight with the two points before mentioned—its present state. A road was made across this filled up bay some 40 years ago, from Cleethorpes to Grimsby, and buildings sprang up, by degrees at first, afterwards rapidly.

The Cleethorpes Gas Company was formed for Cleethorpes. Grimsby being at that time almost as far from the new district as Cleethorpes, and being another parish, a race took place between the two rival companies which should get there first, ending, of course, in a lawsuit, resulting in a parliamentary boundary, which meant to each, "thus far shalt thou come, and no farther," and here shall thy Bills be stayed. The name of the district was New Clee, but now it is in the borough of Great Grimsby. The Cleethorpes Gas Company laid a 5-inch main over 2 miles along the Grimsby road, afterwards replacing it by an 8-inch—the one before you. As a proof that I am in the main correct in the description of the country, I do not hesitate to say that there are thousands of houses to-day standing on sea sand, and, of course, gas mains laid in the same; also that water can be seen draining out of the gravel bed and returning to the sea. When the tide is up, it flows inward through the gravel to some extent; and, of course, returns when the tide falls. There are several brickyards, out of whose pits black wood and parts of trees, and, I have been informed, even stags' horns, are sometimes again brought to the light of day. Two years since, it was decided to lay a main sewer along the aforesaid road, and as the Grimsby Tramway Company had previously put down a single line in the center of the road, with numerous switches, it was, unfortunately for us, considered necessary to lay the sewer between the line and our main. In order to avoid the former with its traffic, our main was undermined to a considerable distance; and it was suspended in the most thoughtless manner—in fact, the main was more or less visible all along the road. At the point where the operations commenced, all unknown to us, from the above reasons, the gas supply was placed in the utmost jeopardy. Our solicitor at once wrote to the Board, calling their attention to the danger and responsibility, which had good effect for a while.

All went well until the 8th of August, when the ground subsided some few hundred yards further down the road. (See Fig. 1.) This was over part of the bay before mentioned. It happened in this way: The trench was timbered, but not low enough. The ground was sand and gravel, and the trench made a deal of water, which had to be pumped out before any pipes could be laid, very few of which could be got in at once. By pumping the water and throwing out the loose sloppy sand and gravel, the latter began to purge out from behind the backings as the bottom of the trench was lowered; making still more room for the ground behind the timber to drop, which it did, forcing the boards below the walling until they almost met. I do not think the main dropped then, because it was much nearer the surface than the sewer, and was held up by the timber, which was all right at the top. The pipes were put in as quickly as possible, you may be sure; but the timber was drawn too early—causing the ground to crack on each side and fall in as far as it could, in some instances only very little, in others a

foot and even more. We at once bared the main, when it was found to have subsided, as shown in Fig. 1. Several of the joints were drawn. These were at once stopped temporarily, as we were suspicious of further subsidence. I then had to think of the best means I could to lift the main back to its proper position, as we were almost innocent of the

Fig. 1.

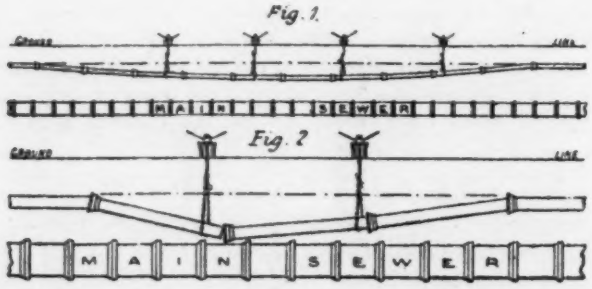


Fig. 2.

Fig. 3.

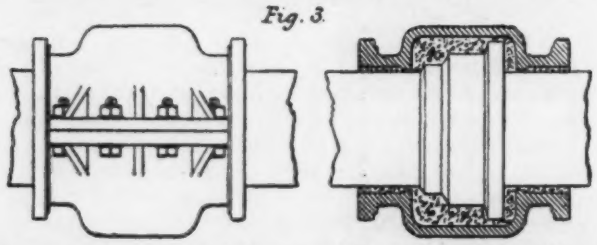


Fig. 1.—Plan Showing a Subsided Gas Main. Fig. 2.—Subsidence and Fracture of a Gas Main. Fig. 3.—Shows Method of Repairing.

same; and I could only turn out my men, some with bottle jacks, some with blocks, and others with that earliest mechanical power of all, the lever, giving the passer-by the impression that the job had been let at random to a marine store dealer, to accomplish in any way he chose, and with anything that first fell to his hand out of his miscellaneous collection. I should mention that it occurred in the height of the Cleethorpes season, and that thousands of people passed daily along the road from all parts of the country. Having several spare retort handles and crossbars, I got four of the T-handles made into hooks and the crossbars into nuts, with two handles (see Figs. 1 and 2). We then got some strong chains, and there being plenty of timber on the spot we placed two planks across the trench (edgeways, as shown), with an iron clasp to prevent them parting, a washer under the nut well oiled, and posted a man at each screw—giving the two in the center orders to slightly tighten their chain and the two outside to keep gently following as they felt their chain slackening. We took care to follow up the main with suitable backings in its upward movement; and fortunately we did, for two chains broke, and, but for that precaution, the last fall would have been worse than the first. After restoring the main to its original position, lead joints were made, and so completed.

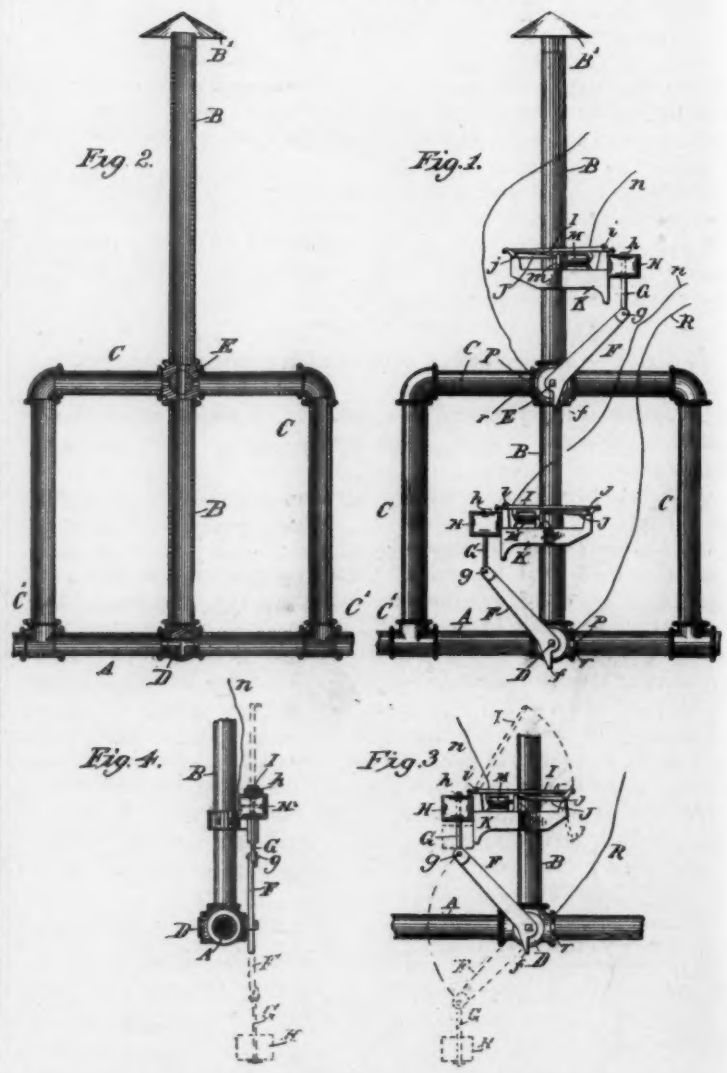
Subsidence No. 1.—Another gang of men commenced a mile or so further down the road, and thinking the ground was sound (it looked very good clay), never put in a strut at all, until the walls of the trench showed unmistakable signs of meeting, but luckily left our main in position. Subsidence and fracture No. 2.—On the 17th of August another and more dangerous slip occurred. We lifted the main at once, and found it broken in two. We ran lead joints and temporarily repaired the broken part, and filled up for Sunday, it being close to a switch of the tramway, and interfered with the working of the cars. In truth, that was partly responsible for the mishap. As soon as possible we got a muff (shown in Fig. 3) and placed it in position, built up two clay collars and mouths to a sufficient height, and then poured into one pure Portland cement, rather thin at first and afterwards thicker, until the water and thin cement flowed out of the other mouth, the solid settling at once in the cavity, a hole having been previously drilled in the top of the muff to let out the air and also to watch the cement. After hardening a little the clay collars were removed and the faces trowelled up. A perfectly sound joint was made; and there has not been the slightest escape of gas since, as far as I know.

Conroy's Cut-Off and Relief Apparatus for Gas Mains.

U. S. Letters Patent (No. 424,761) were granted, on April 1st to Jas. C. Conroy, of Pittsburgh, Pa., for improvements in cut-off and relief apparatus for gas mains. According to the specifications the objects of the invention are, first, to provide a simple and convenient means for shutting off gas by control of an electrical circuit or equivalent connection from a line or section of piping, and for relieving the cut-off line from pressure immediately when the passage in the main is closed; second, to provide means for immediately, if desirable, letting on the gas after it has been cut off, and for closing the escape passage; and third, to provide, in combination with the gas main, an automatic shut-off, an escapement way, and a bye-pass having a valve for closing the escapement-way, and opening said bye-pass; also, in combination with such improved apparatus, to afford facilities for controlling the operation of the same from the gas office.

In the drawings Fig. 1 is a side view illustrating an arrangement of pipes, valves and valve operating mechanism in accordance with the invention; Fig. 2 is a longitudinal central section through the pipes and valves; Fig 3 is a side view of the valve operating mechanism, with dotted lines showing the action thereof; and Fig. 4 is an end view of the same.

Referring to parts, *A* denotes the gas main or line of pipe through which the gas normally flows; *B* indicates an escape or relief pipe connected at its lower end with said main and its upper end extending to a suitable position for safely discharging the gas into the air, said upper end being open and covered by a hood or cowl *B'*; *C* indicates a bye-pass pipe that connects with the main at opposite sides of the escape pipe, as at *C'*, and centrally with said relief pipe; *D* indicates a rotating valve or stopcock located at the junction of the relief pipe *B* with the main *A*, and having a three-way port therethrough. The normal position of the valve *D* in the main is, with its straight ports leading directly through and its third port at the bottom, as shown in Fig. 2; *E* indicates a rotating valve or stopcock located at the junction of the relief pipe *B* with the bye-pass *C* and provided with a two-way port. The normal position



of the valve *E* is with its port open in line with the relief pipe, or with the bye-pass closed, as shown in Fig. 2.

Any suitably arranged mechanism can be employed for operating the respective valves *D* and *E*, but the inventor prefers to employ an automatic mechanism which can be controlled from a central station by electric or other suitable connection, and in the present instance he shows an electrically actuated mechanism arranged substantially as follows: A lever or arm *F* is attached to the axis of the valve, and to the outer

end of the arm there is connected, by a hinge or pivot *g*, a link *G* that carries a weight *H*. This weight is preferably loose or free to slide on the link, but retained thereon by a head or nut at *h*. Above the arm and supported by a suitable bracket *K* is arranged a trap lever *I*, pivoted or fulcrumed at *i*, and having its shorter arm fitted to engage with a loop or detent on the weight *H* for sustaining said weight elevated, while the opposite end of said trap lever *I* is held down by the escape lever *J*. (See full lines, Figs. 3 and 4.) The lever *J* is fulcrumed at *j*, and is in turn retained by the armature *m* in front of the electro-magnets *M*, which magnets are connected by wire *n* with the central gas office, where suitable batteries and circuit breaking and closing apparatus are combined therewith for sending through the magnets *M* the requisite impulse for moving the armature *m* and releasing the escape lever *J*. In connection with the valve or its operating arm there is provided a lug or finger *f* that comes into contact with a stop or projection *P*, which prevents movement of the valve past the desired position.

The operation is as follows: When the magnet draws back the armature *m* the escapement lever *J*, being thereby released, drops down and allows the trap lever *I* to swing upward and release the weight *H*. (See dotted lines, Fig. 3.) The weight then slides down the link *G* and against the end of the arm *F*, thus giving a stroke to start the valve in case it does not move freely. The link, weight and arm then swing downward, and as the arm descends the link *G* turns over on its hinge *g*, so that the weight can again slide outward thereon and against the head *h*, thus giving a second blow or shock for insuring the complete movement of the valve.

The valve *D* is operated when it is desired to cut off the flow of gas through the main. This instantly closes the main and simultaneously brings one port of the valve into line with the passage of relief pipe *B*, thus giving vent therethrough for relieving the pressure in the section cut off.

When the valve *D* has been closed and it is again desired to let on the gas to the cut off portion of the main, it is done by operating the valve *E*, which valve closes the passage through the escape pipe *B*, and opens the passage through the bye-pass pipe *C*.

The stop-lug *P* is preferably furnished with contact points *r*, from which a wire or wires *R* lead to and connect with an annunciator in the gas office. The finger *f* completes the electric circuit at *r* when the weight *H* falls, and thus sends back a signal to the gas office that the valve has properly operated.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE sub-committee of the Committee on Manufactures of the Massachusetts Legislature (who are accompanied by Messrs. C. P. Greenough, of Boston, and J. L. Sargent, of Lowell) have been inspecting the various gas works in Virginia that are under municipal control—of course, the inspection was ordered with a view to the acquirement of practical knowledge respecting the degree of success attained by such management, the information to be applied to shaping the policy of Massachusetts in the instance of gas and electric light supply in that State. The Richmond works seem to have interested the committee most, and the inspection there appears to have resulted in the verdict that the plant is well managed; but as gas men are quite well conversant with that fact, they will not be surprised at such an expression of opinion. Another hint, though, in connection with the inspection may be found in the fact that the Mayor of Richmond admitted "that it was more costly to run than a private system would be."

AN explosion occurred recently at the gas works at New Rochelle, N. Y., which cut gas off from the town for an evening or two. Mr. C. C. Van Benschoten, Manager of the works, was slightly injured.

AT the annual meeting of the Fulton-Municipal (Brooklyn, N. Y.) Gas Company the following Directors were chosen: Benjamin Brewster, H. H. Rogers, Wm. Rockefeller, H. R. Bishop, James Jourdan, E. C. Benedict and J. F. Freeman.

THE new rate at Doylestown, Pa., is $1.60 per 1,000 cubic feet, with 5 per cent. off for prompt payment. The former gross rate was $2 per $1,000.

AT the annual meeting of the Rome (N. Y.) Gas Light Company the following result was reached: Trustees, Messrs. G. N. Bissell, J. D. Higgins, Calvin Petrie, T. H. Stryker, E. H. Walworth, H. T. Utley and W. R. Huntington; President, G. N. Bissell; Vice-President, T. H. Stryker; Secretary and Treasurer, W. R. Huntington; Inspectors of Election, John C. Bissell and Howard E. Ketcham.

No reasonable man can deny that the gas distributed by the proprietors of the Atlantic City (N. J.) Gas Company is as good, in respect to illuminating power, as any gas distributed by any other illuminating gas company in that State. There, however, our commendation of its business methods must cease; for the Company pays no attention whatever to the consumers' burners, which, as a rule, are of the most imperfect sort. In further connection with that forest of hotels (they are all frame structures) we may mention that the incandescent electric light is rapidly losing whatever prior hold it may have had upon the affections of the residents.

THE proprietors of the Malden and Melrose (Mass.) Gas Light Company have decided to construct another gasholder (200,000 cubic feet capacity) on their Malden property.

THE Directors of the Hackensack (N. J.) Gas Light Company have announced the following schedule to take effect on May first:

Monthly Consumption.	Net Rate per M.
5,000 cubic feet and under	$2.50
5,000 cubic feet to 10,000	2.25
Over 10,000 cubic feet	2.00

WE are indebted to a Troy (N. Y.) correspondent for the following: "Negotiations which have been pending for a week or ten days, looking to a purchase of the Troy and Edison electric light plants operated by the Troy Electric Light Company, by the Troy Gas Company, were concluded on Saturday, April 12, when the agreement and papers of sale were signed in the office of Smith & Parmenter. By the terms entered into by Albert E. Powers, for the Troy Electric Light Company, and A. N. Brady, for the Troy Gas Company, the latter receives, on May 1st, all of the stock in the Company represented by Mr. Powers, paying for the same the sum of $190,000. The obligations of the Troy Electric Light Company must not exceed $189,000. Stockholders will suffer loss, as the original plant, independent of the Edison works at the railroad depot, cost $250,000. The Troy Gas Company by this sweeping purchase obtains a monopoly of the commercial, private and public lighting of Troy and Lansingburgh."

ASSOCIATED Press despatches (dated 14th inst.) brought the news that the plant of the Madrid (Spain) Gas Company was badly damaged through an explosion.

SOME time ago we noted a reduction in gas rates that had been made by the Alton (Ills.) Gas and Electric Light Company, and predicted that President Underwood and Superintendent Tracy would likely be surprised at the gas boom that would ensue when the "folks about town" fully comprehended the liberality of the Company's move. That the prediction was well founded would seem from the following extract from a letter (under date of April 11th) at hand from Superintendent Tracy: "* * *. The reduction in price of gas here has given us more than we can possibly attend to. I have three men connecting meters and gas stoves, and took on eight new consumers last week, and have at least a month's work before me on stoves and new services, with more coming." Well, Mr. Superintendent, we are of the opinion that you won't tire of your activity.

THE City Council of Florence, Ala., has finally agreed to grant to Mr. C. W. Butterworth and associates a franchise for the construction and operation of a gas works at that point. The grantees are to expend at least $40,000 on the plant, which is to have a capacity equal to the requirements of a city of 25,000 population. The system is to be completed within 6 months. This place is the capital seat of Lauderdale county, Ala., and is on the north bank of the Tennessee river (the latter is spanned here by a substantial bridge), at the head of steamboat navigation, and at the lower end of the Mussell Shoals. It is 70 miles west of Huntsville, and can easily be reached by rail. It is a briskly thriving place, and bids fair to be in a short time a great manufacturing center. Population, about 7,500.

MR. FRANK M. DUNLAP, formerly at Detroit, Mich., has secured a position with the Brunswick (Ga.) Light and Water Company.

A VERY pleasant family reunion was that which was held in Belleville, Ills., on April 7th, on the occasion of the anniversary of the birthday of Mr. John Eimer, President of the Belleville Gas Light and Coke Company.

AT the special meeting of the stockholders of the Louisville (Ky.) Gas Company, convened for the purpose of passing on an amendment to its charter relinquishing its exclusive right to manufacture fuel gas in the city, 9,588 shares were represented, and all favored the adoption of the amendment.

THE Worcester (Mass.) Gas Light Company will build a new retort house on Quinsigamond avenue, that city. The structure will be 102 by 68 ft., and 43 ft. in height. Messrs. Pellet Brothers are to do the mason work.

GALESBURG, Ills., "points with pride" to its $1.50 gas rate. So it should.

THE proprietors of the White Plains (N. Y.) Gas Company and of the White Plains Electric Light Company have agreed to consolidate their forces under the corporate title of the White Plains Gas Light Company.

THE St. Thomas (Ont.) Gas Company has bargained with the Westinghouse Company for an incandescent electric lighting plant rated to a capacity of 750 lamps of 16-candle power each. The Company's service rate will be 1 cent per hour per light.

THE use of gas for purposes other than illuminating is rapidly spreading in the Eastern States. Mr. Hallett's paper on what he did at Springfield in this line is bearing fruit.

FROM the annual report of General Wagner, Director of the Department of Public Works, Philadelphia, Pa., we make the following extracts in respect to his mention of the workings of the Gas Bureau: The output was 52,980,000 cubic feet less than in the previous year, but this reduction was not caused by reduced consumption, the quantity sold and paid for, as well as the quantity sold for which bills are not yet due, being greater than ever before. An increase of 39,877,914 cubic feet, or over 1 per cent. of the whole output, sold to consumers, and a decrease of 92,858,514 cubic feet, or nearly 2½ per cent., in leakage, and in the consumption of gas furnished the city free of cost, produce large figures when they enter into the receipts and expenditures. The figures are increased still more by reason of the increased production of gas per pound of coal carbonized, amounting to 7,548,500 cubic feet. When, in addition to this, the report shows that 5,241 new meters, and 10,076 new services were introduced last year, that 113,474 lights were added, and that the number of gas consumers is 128,867, it can be reasonably inferred that the days for the use of gas manufactured by the Department of Public Works of the city of Philadelphia are not yet numbered. If it is claimed that some of the gas falls below the standard it is only necessary to state that all the gas stations are connected by large mains, and that no portion of the city can be supplied exclusively with gas from any particular works. When the works passed under the control of this department it was found that they were deficient in all that constituted first-class works of a construction suitable to make good gas and at the lowest prices. Labor saving machinery had never been introduced, and but two stacks with modern appliances for carbonizing coal had been built. The men numbered 2,257, and the cost for skilled and unskilled labor, especially for the latter, was startling. The manufacturing capacity was insufficient to meet the demand at the period of greatest consumption, and the pipes and mains were totally inadequate to distribute the gas made. In fact the works were short of everything but men. At the close of a little more than two years of the new management, by the introduction of labor-saving machinery, the rebuilding of old stacks with benches of 6's instead of 3's, and with the modern "regenerative" furnaces and appliances, and by the introduction of water gas, the manufacturing capacity has been increased from 13,000,000 to 20,000,000 cubic feet in 24 hours; the holder capacity has been increased from 12,000,000 to nearly 15,000,000 cubic feet; and greater length of pipe and mains, especially the latter of large size, were laid than ever before in the same period of time.

Appended is a table showing the maximum daily capacity of the works, as follows: Ninth Ward, 6,600,000 cubic feet; Twenty-first Ward, 200,000 cubic feet; Twenty-fifth Ward, 4,000,000 cubic feet; and Twenty-sixth Ward, 4,300,000 cubic feet—a daily total capacity of 15,100,000 cubic feet. This does not include the plant of the Philadelphia Gas Improvement Company. Fourteen thousand three hundred and thirty-three meters and 26,924 new services have been introduced, the Director said, and the number of lights and of consumers has been increased from 1,886,599 to 2,206,013 of the former, and from 114,386 to 128,867 of the latter. The number of men employed has been reduced from 2,257 to 1,518 during the same period. All the expenses of the works, including extensions amounting to $506,312.58, and which would have been charged to capital account in any manufacturing establishment, were paid out of the current receipts, and a balance of $1,435,796.16 of actual cash remains in the city treasury. Because of the improvements already made, and of others contemplated and under contract, the results of the past two years are but a slight indication of the profits to accrue to the city from her gas works in the immediate future.

The most important event of the year, and perhaps in the history of the Philadelphia gas works, was the completion of the water gas plant, of which a detailed report was made a year ago. The buildings and machinery were finished and gas was delivered as agreed upon, the first passing into the city's holders on January 22d, 1889. The total quantity purchased during the year was 919,647,000 cubic feet, reducing the output of coal gas to 2,231,507,000 cubic feet; total output, 3,151,156,000 cubic feet. The tests made in the contract prove this gas to be of the standard contracted for, and the mixed gas, produced by its passage into the holders simultaneously with the gas made from coal, gives satisfaction to the consumer. It is but proper to state that very few complaints of the quality of the gas furnished come from those parts of the city in which the largest proportion of this gas is burned. The new 20-inch main under contract to be laid from the Twenty-fifth Ward works to the holder station at Ninth and Diamond streets, and on York street from Ninth street to Ridge avenue, will deliver larger quantities of this gas in the northwestern part of the city. If gas is needed in excess of the quantity named in the contract, "not exceeding 3,000,000 cubic feet per day," this plant can readily be increased to double these figures. It is well also to recollect that the city has the option of purchasing these works at any time. A decrease in the output of coal gas because of the quantity of water gas used caused a reduction of 210,666,305 pounds of coal carbonized.

In commenting on the foregoing facts and figures, showing a condition of the management of the city's gas works which must satisfy any reasonable man that the past year has been not only a year of large profit to the city and of general improvement to the works, but also a year of the manufacture of the best gas ever distributed from these works, a local critic says: "We cannot shut our eyes to the fact that there is a widespread belief that exactly the opposite of all this is the case; that the works are badly managed; that the product is poor and getting worse; and that the whole property had better be sold or given to some one who can do things better than the present official. There are those who contend that the gas furnished is bad, and no matter what the place or the occasion, the burden of their tale is the 'bad gas,' by which they claim the people of our city are being robbed. Where this is the result of personal or political ill-feeling caused by disappointed desires for gain of money or of place, it would be a waste of time to even attempt the effort to convince to the contrary—the story has been told so often that the teller actually believes it true; but, where it is the result of an honest misapprehension of the facts as they are, it is due to the citizen, as well as to the officials of this department, that the truth should be published."

Of the operations of the new Bureau of Lighting the Director reports that during 1889 there were in the city 1,045 electric arc lights, 6,476 gasoline lamps, 380 lamps supplied by the Northern Liberties Gas Company, 10,074 under the Bureau, 50 electric lights under the Board of City Trusts, and 149 lamps under charge of the Bureau of Correction—a total of 26,174, the cost to the city for lighting and maintaining being $467,652.27.

The lighting by electric arc lights is done under annual contracts with 7 different companies, dividing the city into districts suited to the location and the capacity of the power stations of the several companies. The number of lights at the close of the year was 1,045, maintained at a cost to the city, per lamp per night, of from 55 to 45 cents, with an average cost of 48½ cents. The contracts for 1890 have been made at an average cost of 47¾ cents per lamp per night for an estimate of 1,245 lamps.

The territory lighted by underground wires has not been extended during the year, but the continued satisfactory service rendered in the districts so lighted during the past year proves that there are no insurmountable difficulties in the way of putting electric light wires underground, and they will be so placed whenever ordinances requiring it shall be enacted.

MR. W. ELIOT FETTE and his associates in the management of the Dedham and Hyde Park (Mass.) Gas and Electric Light Company are again to the fore with a practical exposition of their opinion in respect to the policy of selling gas cheaply. The latest exemplification of their belief is shown in the action taken by them on the 15th inst., when it was resolved to reduce the gross rate to $2.50 from $3 per 1,000 cubic feet, promt payment—that is, on or before the 15th of each month—to secure to the user a rebate of 20 per cent. This net rate (which is an

"all round" one) of $2 per 1,000 is a remarkably liberal one for the locality.

A CORRESPONDENT, writing from Austin, Ills., under date of 12th inst., says: "It looks now as though a new gas works for the town of Cicero, Ills., which includes within its precincts Austin, Oak Park, Ridgeland, Clyde, and some others of Chicago's suburban villages, will be built here this summer. In any event the Globe Light and Heat Company, a branch of the Philadelphia concern of that name, has accepted the last franchise granted them by the Town Board of Trustees; and Mr. Tolles, its Manager, and one of the grantees of the franchise, tells me that some of the pipe is already on the way here. I understand that the Hanlon-Leadley apparatus will be put in here, as the Philadelphia Company controls that process. If anything comes up that I think will interest you in this matter, as the work progresses I will keep you informed.—B."

A THOROUGH working test of the washer recently invented by Mr. N. C. Dye, of Rutland, Vt., is being carried on at the Bay State Company's Boston works. So far, we understand, the results are excellent.

THE Brooklyn Gas Light Company has notified City Works Commissioner Adams that it will accept the proposition of the city to pay only $19.80 per annum for each gas lamp to be maintained in the Company's district. In the lighting competition for the current year the Company submitted a bid of $22 per post. This is a square backdown on the part of the Company, and would seem to indicate a trifle of weakness in its management; for the latter certainly ought to have known at the time of the general competition whether or not the supply could be under taken on the basis of the figure now accepted.

IT is with the greatest satisfaction that we note that the Sage of Indianapolis is to retain his place as Superintendent of the Company that he has served for years with such great success.

IT is refreshing to note that the Youngstown (O.) *Telegram* has just put itself on record in the following remarks: "A New York philanthropist has investigated 560 complaints against gas companies, all charging chicanery or dishonesty, and he reports that he did not find a single instance where a company wilfully sought to defraud. He adds that no other business in the world is conducted on more straightforward principles."

ON and after May 1 the Saratoga (N. Y.) Gas Company's selling rate will be $2.25 per 1,000, with 5 per cent. off for cash.

A RECENT issue of the Omaha (Neb.) *World-Herald* contains the following: "A Gas Company, which is entirely under control of Omaha men, and known as the Nebraska Gas and Fuel Company, has made a move by which it is proposed to illuminate the streets of the southern portion of the city. Caspar E. Yost, the Vice-President, appeared before the Board of Public Works, and upon his application permission was granted to lay mains in the following streets and alleys: Second street, between Poppleton avenue and Hickory street; Hickory street, between Second avenue and Fourth street; alley between Pine and Hickory, to Fourth street; Pine street, from alley between Woolworth avenue and Williams street; alley between Woolworth avenue and Williams street, from Fourth to Fifth; Fifth street, from alley between Woolworth avenue and Williams street, to Poppleton avenue; Poppleton avenue, from Fifth to Sixth streets; Sixth street, from Poppleton avenue to alley between Pierce and Williams; alley between Pierce and Williams, from Sixth to Tenth streets; Tenth street, from alley between Pierce and Williams, to Pierce street; Pierce street, from Tenth to Eleventh; Eleventh, from Pierce to Williams; and Williams, from Eleventh to Thirteenth streets. The work is to be in accordance with the ordinance dated December, 1888, and to be governed by the rules and inspections of the Board of Public Works. In order that the city may know the work is being performed in a proper manner, Mr. Donavan has been appointed inspector for the city. The Company has recently purchased the old buildings of the Boyd Packing Company, and will at once commence putting the buildings in shape so they may be used as the works for the gas plant, and in the meantime mains will be laid in all the streets and alleys asked for in the above petition."

SOME time ago we noted that Mr. S. B. Conde, the Engineer in charge of construction work on the plant of the "Oxy-Hydrogen Company," of Wilmington, Del., was endeavoring to secure applications from the residents of that city for gas to be supplied from the mains of the "Oxy-Hydrogen Company," when the latter was actually in the field as a competitor of the old Wilmington Coal Gas Light Company. One of Engineer Conde's appeals takes the form of a circular, and it is so rich in its terms that we think our readers will receive both amusement and instruction from a perusal of it. Mr. Conde says: "After April 15th the Oxy-Hydrogen Company will be prepared to take orders for gas of a superior quality to that now furnished to the citizens at 75 cents per 1,000 feet, net, if promptly paid within 10 days from the time of delivering the bill. The works will be ready for delivering gas next fall, and service connections will be made as fast as the mains of the Company are extended. Mains will be laid first upon the principal streets, and gas takers upon those streets are invited to give early orders, so that we may have some guide in laying the first arrivals of pipe." In the meantime we might say that President Betts, of the old Company, does not seem to be greatly disturbed over the situation, to which he still undoubtedly holds the key.

THE premises No. 239 E. 17th street, this city, were badly damaged by an explosion of illuminating gas on the morning of the 14th inst.

IT is reported that the Westinghouse Electric Company, of Pittsburgh, is negotiating for the purchase of the Brush Company's plant and system in Baltimore, Md.

THE McComb (O.) Gas and Fuel Company has been incorporated with a capital of $50,000.

THE Village Board, of Ilion, N. Y., has received the following bids in response to an invitation for tenders for the public lighting by arc lamps, 2,000-candle power each, to be maintained on a moon table: Thomson-Houston Company, 29 cents per lamp per night; Ilion and Mohawk Electric Light Company, 28½ cents per lamp; Ilion and Mohawk Gas Light Company, 28 cents.

Coal Miners' Strikes and London Fuel Supply.

Engineering, in commenting on the disturbances occasioned by the recent strike of the English coal miners, remarks that the fact that fuel is the chief factor in all manufacturing and industrial enterprise is acknowledged universally, but it was never brought home to the minds of all sections of the community so vividly as during the few days over which the coal miners' strike extended. Within a few hours, comparatively speaking, there was a dearth of fuel, in some industrial centers there was positively a coal famine. Prices went up in London from 3s. to 3s. 4d. a ton in the space of two working days. In some manufacturing districts the advanced prices realized reached 10s. per ton. As a matter of fact coal is so essential in all trades and occupations, and in the economy of social life, that utter stagnation and ruin would result if the supplies were cut off for only a few weeks. The immediate result of the strike was the stoppage of some iron works, where large quantities of coal are consumed; then followed the stoppage of some mills and factories in the textile trades where the tonage consumed weekly is so great that storage rooms for stocks is not possible. There was something approaching to consternation in connection with some of the large gas works of the country where enormous quantities of coal are needed from day to day at the bare prospect of two or three weeks' strike. Happily all anxiety is over, and industrial England breathes freely again. But the lessons taught are not to be forgotten nor lost sight of by all concerned.

Petroleum in Servia.

The Belgian Minister at Belgrade, in his last report to the Belgian Foreign Office, says that up to the present time no petroleum in a liquid state has been discovered, but the country is exceedingly rich in bituminous schist. The following are the principal places in which it is found: The Department of Pojarevatz by the side of the river Pec, between the villages Zelenik and Lechuitza, stretching towards the villages of Vodkovitch and Kakova Bara, up as far as Snegatine; the Department of Kniajevatz, in the whole of the southwest basin of the Timok, from Sorlingue, near Kniajevatz. Bituminous schist has also been found in Brehatz and Nina, while in the neighborhood of Trgovichte there is a veritable mountain of schist. In the Department of Nisch it is found at Zelachnitza, and it is frequently met with in the Departments of Alexinatz and Tchoupria, particularly in the basin of the Montnitza and Vitchevatz, which extends to the north as far as the river Ressava, and to the south as far as Rajagne. In the Department of Valievo it is found in the basin extending from Kaloubara to Ligne. Up to the present no one in Servia has engaged in the business of extracting petroleum from these deposits of schist.

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MONDAY, APRIL 21, 1890.

Gas Stocks.

Quotations by Geo. W. Close, Broke and Dealer in Gas Stocks.

16 WALL ST., NEW YORK CITY.

APRIL 21.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	97⅜	97½
Central	500,000	50	85	95
" Scrip	220,000	—	95	100
Equitable	4,000,000	100	117	119
" Bonds	1,000,000	—	113	115
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	115	120
Mutual	3,500,000	100	109	112
" Bonds	1,500,000	—	100	102
Municipal, Bonds	750,000		—	—
Northern		50	—	—
" Bonds	150,000	—	—	100
Standard Gas Co —				
Common Stock	5,000,000	100	—	45
Preferred	5,000,000	100	84	87
Yonkers		50	112	—
Richmond Co., S. I.	346,000	50	—	—
" Bonds	20,000	—	—	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	115	120
Citizens	1,200,000	20	68	70
" S. F. Bonds	320,000	1000	100	103
Fulton Municipal	3,000,000	100	125	130
" Bonds	300,000		100	105
Peoples	1,000,000	10	84	88
" Bonds (5's)	368,000	—	100	—
" " (6's)	94,000	—	100	—
Metropolitan	1,000,000	100	100	104
Nassau	1,000,000	25	120	—
" Ctfs	700,000	1000	100	102
Williamsburgh	1,000,000	50	123	125
" Bonds	1,000,000	—	110	112
Out of Town Gas Companies.				
Boston United Gas Co.—				
1st Series S.F. Trust	7,000,000	1000	93	93½
2d " " "	3,000,000	1000	71	72
Bay State Gas Co.—				
Stock	5,000,000	50	23½	25
Income Bonds	2,000,000	1000	—	—
Buffalo Mutual, N. Y.	750,000	100	90	95
" Bonds	200,000	1000	95	100
Citizens, Newark	1,000,000	50	155	160
" " Bonds.	45,000	—	—	—
Chicago Gas Trust	25,000,000	100	48¼	—
Chicago Gas Light. & Coke Co.—				
G't'd Gold Bonds	7,650,000	1000	93⅜	93⅝
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1000	94⅞	95½
People's Gas and Coke Co., Chicago—				
1st Mortgage	2,100,000	1000	—	100
2d "	2,500,000	1000	96	100
Consumers Gas Light Co., Jersey City	2,000,000	100	20	—
Bonds	600,000	1000	80	—
Cincinnati G. & C. Co.	6,000,000	100	201	203
Consumers Toronto	1,000,000	50	190	200
Central, S. F., Cal.			80	90
Capital, Sacramento, Cal			58	
Consolidated, Balt.	11,000,000	100	49¼	49¾
" Bonds	6,400,000		107	107½
Citizens Gas Lt. Co., Rochester, N. Y.	500,000	—	75	90
Bonds	250,000		—	—
Hartford, Conn.	750,000	25	102	108
Jersey City	750,000	20	170	175
Laclede Gas Light Co., St. Louis, Mo.—				
Common Stock	7,500,000	100	10	16
Preferred "	2,500,000	100	—	—
Bonds	9,034,400	1000	82	—
Louisville, Ky.	2,570,000	50	125	130
Little Falls, N. Y.	50,000	100	—	100
" Bonds	25,000	—	100	103
Montreal, Canada	2,000,000	100	200	208
Memphis (Tenn.) Gas	750,000	100	40	—
" Bonds.	240,000	100	103	—
New Haven, Conn.		25	200	—
Oakland, Cal.			35	35½
Peoples, Jersey City			—	60	61
" " Bonds.				—	—
Paterson, N. J.		25	99	102
Rochester, N. Y.		50	99	100
Syracuse, N. Y.	500,000	25	—	—
San Francisco Gas Co. San Francisco, Cal.	10,000,000	100	55½	55¾
Washington, D. C.	2,000,000	20	200	208
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The Ironwork for Twelve Benches of 6's, viz.:

Cast Iron Hydraulic Main.

7-inch Dip-Pipes, Stand-Pipes, and Bridge-Pipes, complete.

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Lids and Mouthpieces only in use over a year. Will be sold cheap.

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60,000 Cu. Ft. Daily Capacity.

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For Water Supply Tanks.
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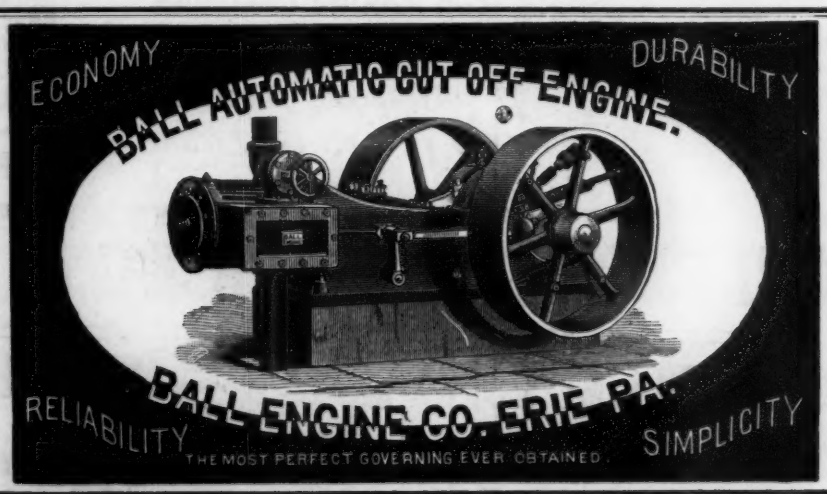

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THE FUEL GAS AND LIGHT IMPROVEMENT CO.

OF AMERICA.

Owner of the Mackenzie Patents of Dec. 31, 1889,

For the United States, England, Russia, France, Germany, Austria, and Canada,

No. 32 Park Place, New York City.

This SYSTEM is an ABSOLUTELY NEW DEPARTURE IN THE MANUFACTURE OF FUEL AND ILLUMINATING GAS.

The COST OF GAS IN THE HOLDER by our System is at least THIRTY PER CENT. LESS than that made by any other process of he day. The Gas contains neither SULPHUR nor other impurities, nor is there any resultant LAMPBLACK OR TAR RESIDUUM.

The Gas is manufactured WHOLLY from LIQUID HYDROCARBONS, such as Lima, Penn. Crude, and Fuel Oils, Naphtha, etc.

Neither PERISHABLE PIPES nor other RETORTS, NOR THEIR EQUIVALENTS, are used. The Gas requires NO PURIFICATION.

Neither COAL, COKE, nor any other HARD CARBONS enter into the manufacture or composition of the Gas, thereby requiring LESS LABOR THAN ANY OTHER METHOD. The APPARATUS is extremely SIMPLE, SUBSTANTIAL, and DURABLE.

Works under our system can be CONTINUOUS or ALTERNATING If alternating, the Nitrogen present will be less than 4½ per cent. If continuous, the limited amount of Nitrogen present is neutralized by Carbon.

One gallon of Lima oil by our process EQUALS ALL THE COAL required for making 1,000 feet of carbureted Water Gas.

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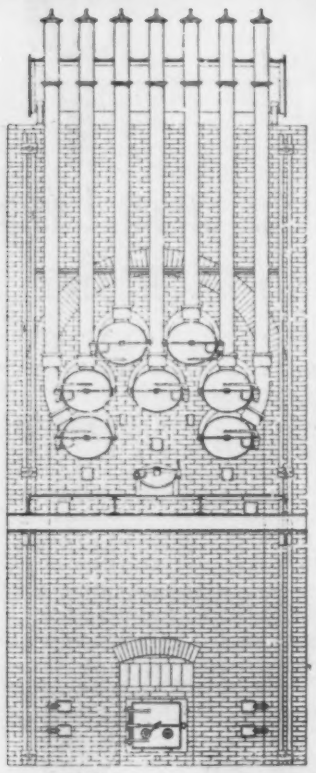

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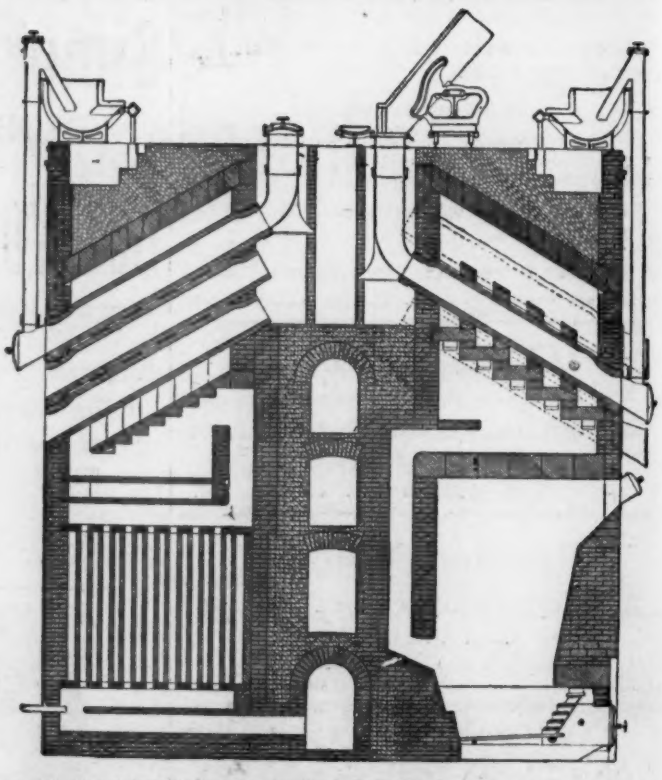

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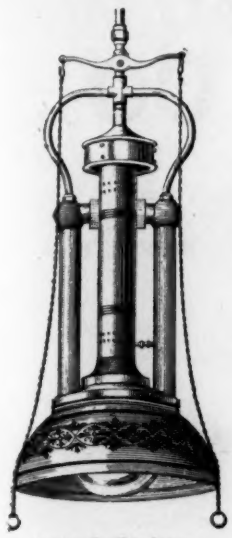

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A Successful Competitor of the Incandescent Electric Light for Interiors, etc. Is especially applicable for the lighting of Offices, Stores Factories, Mills, Show Windows, Libraries, and all situations where an increased illumination is desired.

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OF
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OFFICE, DREXEL BUILDING, PHILA., PA.

At the Fall Session of the Board of Supervisors of Winnebago County, held at the County Court House, Oshkosh, Wis., Nov. 26, 1889, the report submitted by Mr. C. W. Cook, Chairman of the Committee on Public Buildings, recommending the use of the Welsbach Incandescent Gas Burner in the Buildings under their charge, was unanimously adopted, because of the extreme economy in the consumption of Gas and the superior character of the light obtained.

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MANUFACTURED BY

GEORGE M. CLARK & COMPANY,

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EVERY CONCEIVABLE SIZE AND STYLE,

Ranging in Prices from $1.50 to $30.00.

WE USE NO GAS COCKS.

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THE SPRINGER CUPOLA SYSTEM

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GUARANTEED ESTIMATES of Cost of Gas Furnished on Application.

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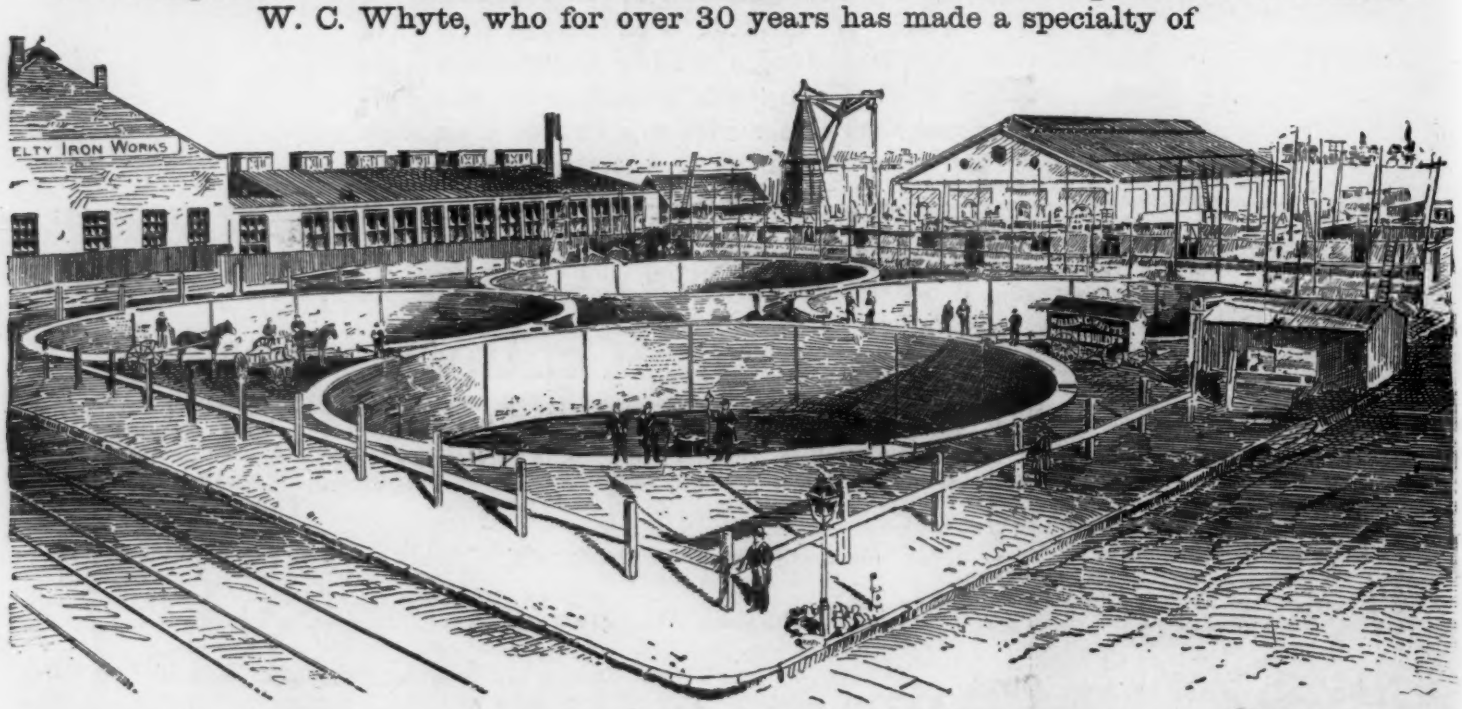

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PRESSURE GAUGES OF ALL KINDS,

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Apparatus for Testing the Quantity and Quality of Gases.

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Erected and in course of construction at present date:

	Capacity. Cubic feet per day.
Altrincham	600,000
Adelaide	600,000
Aldershot	200,000
Allegheny, U. S. A.	1,000,000
Ashton-under-Lyne	1,250,000
Amsterdam	1,500,000
"	1,500,000
Annaberg	200,000
Arcachon	100,000
Animal Charcoal Co	200,000
Altoona, U.S.A.	350,000
Buxton	250,000
Bradford	1,000,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,000,000
"	1,000,000
"	3,000,000
Bremen	150,000
Baltimore, U.S.A.	1,000,000
"	1,900,000
"	1,000,000
Balmain, N.S.W	125,000
Bishops Stortford	150,000
Blackpool	400,000
Brussels	1,250,000
"	1,250,000
"	750,000
"	1,250,000
Banbury	250,000
Birmingham	5,000,000
Birkenhead	2,500,000
Blackburn	1,500,000
Bochum	600,000
Burntisland	250,000
Boston, U.S.A.	2,000,000
Brisbane	1,500,000
"	300,000
Burton-on-Trent	1,500,000
Barcelona	350,000
Barking	100,000
Baerlien & Co	20,000
"	20,000
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" " Citizen	500,000
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Bergen	350,000
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Bournemouth	1,000,000
Bridgeport, U.S.A.	500,000
Brunswick	300,000
Beck & Co., St. Louis	100,000
Barmen Rittershausen	600,000
Bexhill	125,000
Brooklyn, U.S.A.	1,000,000
"	1,000,000
" Nassau	1,000,000
Brunner, Mond & Co.	400,000
Cheltenham	2,000,000
Cannes	200,000
Croydon	1,500,000
Copenhagen	200,000
Clevedon	200,000
Columbus, U.S.A.	500,000
Cincinnati, "	1,500,000
" "	1,500,000
Chicago "	3,000,000
" "	1,000,000
" "	1,000,000
Chemnitz	1,000,000
Crewe	1,250,000
Colonial Gas Works Co	100,000
Cadiz	300,000
Charlottenburg	600,000
Dudley	750,000
Driffield	100,000
Dukenfield	500,000
Dover	750,000
"	1,000,000
Deal	200,000
Derby	1,500,000
Dublin	3,000,000
Dowlais	100,000
Douai	500,000
Denton	500,000
Derby, U.S.A.	350,000
Denver, "	500,000
" "	1,000,000
Dusselldorf	750,000
"	500,000
Dumfries	250,000
Dunedin, N.Z	400,000
Darlington	1,250,000
Detroit, U.S.A.	750,000
Edinburgh	1,500,000
"	2,000,000
Enfield	300,000
Essen	300,000
Elbing	150,000
Falmouth	150,000
Frankfort	300,000
Farnworth	400,000
Fenton	400,000
Friedenshutte	500,000
Furth	400,000
Freiburg	200,000
Goole	250,000
Glossop	300,000
Guildford	300,000
Gloucester	1,250,000
Gera	300,000
Grafton, N.S.W	100,000
Grieg	300,000
Georgetown, U.S.A.	250,000
Gluckauf	200,000
Heywood	600,000
Holywood	125,000
Huy	70,000
Harrow	250,000
Harrogate	250,000
Halstead	150,000
Heilbronn	200,000
Havana, Cuba	750,000
Hastings	1,500,000
Huddersfield	300,000
"	750,000
"	1,500,000
Hof	200,000
Hampton Wick	500,000
Heckmondwicke	500,000
Haverfordwest	100,000
Halifax, N.S.	350,000
Hamm	200,000
Halle	400,000
Heidelberg	300,000
Hartford, U.S.A.	1,000,000
Ilkeston	300,000
Inverness	250,000
Ilkley	200,000
Ilford	100,000
Kingston-on-Hull	400,000
Kidderminster	750,000
Kidsgrove	100,000
Konigberg	1,000,000
King's Lynn	300,000

LONDON:—

	Capacity. Cubic feet per day.
The Gaslight and Coke Co.:	
Beckton	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	2,500,000
"	2,500,000
Silvertown	1,000,000
Bromley	2,000,000
"	1,500,000
"	1,500,000
"	1,500,000
"	2,000,000
"	1,500,000
LONDON—*Continued.*	
Shoreditch	2,500,000
Pancras	1,500,000
"	1,500,000
Pimlico	2,000,000
Nine Elms	3,000,000
"	3,000,000
South Metropolitan Co:—	
Greenwich	3,000,000
Woolwich	400,000
Vauxhall	3,000,000
"	3,000,000
Lea Bridge	300,000
West Ham	1,500,000
Leeds	2,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	2,000,000
Leominster	150,000
Leiden	560,000
"	600,000
Liverpool	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	3,000,000
Lincoln	1,000,000
"	600,000
Lowell, U. S. A.	1,000,000
Louisville "	1,500,000
Long Eaton	500,000
Lilie	900,000
"	450,000
"	750,000
"	250,000
"	250,000
Luckenwalde	330,000
Liegwitz	300,000
Lincoln, U. S. A.	250,000
Lawrence "	500,000
Lynn "	300,000
Lyons	1,500,000
Maidstone	1,000,000
Marseilles	1,500,000
"	1,500,000
Mons	500,000
Malines	250,000
Melbourne	1,500,000
"	1,500,000
"	1,500,000
"	1,500,000
"	1,500,000
Manchester	2,500,000
Middleton	400,000
Manley, N. S. W.	100,000
Minneapolis, U. S. A.	750,000
Magdeburg	300,000
Memphis, U. S. A	750,000
Nottingham	1,250,000
"	2,500,000
"	2,500,000
"	2,000,000
"	1,500,000
"	2,000,000
Newport, U.S.A.	430,000
Newmarket	150,000
Newark, U.S.A.	680,000
Northfleet	200,000
New York, U.S.A.	2,000,000
Nice	600,000
Newcastle, N. S. W.	200,000
Numea, "	100,000
Namur	250,000
Newark	350,000
Oldbury	500,000
Otley	200,000
Oswestry	250,000
Ober Schlesian	1,500,000
Otto & Co.'s Coke Works	1,500,000
Plymouth	2,000,000
Parramatta, N. S. W.	100,000
Prescott	150,000
Providence, U.S.A.	750,000
"	750,000
Plauen	300,000
"	300,000
Portsmouth	2,500,000
"	2,500,000
Pittsburgh, U.S.A.	1,500,000
Portland, "	560,000
Pawtucket, "	500,000
Quebec	250,000
Radcliffe	750,000
Rouen	250,000
Ramsgate	1,000,000
Reigate	200,000
Richmond, U.S.A.	250,000
Roxbury, "	500,000
Runcorn Soap Co.	20,000
Rockhampton, N. S. W.	125,000
Richmond	1,500,000
Reading	2,000,000
Reichenbach	200,000
Salford	1,750,000
"	1,750,000
"	1,750,000
Smethwick	750,000
Sydney, N. S. W.	1,000,000
"	1,000,000
"	2,500,000
"	50,000
"	50,000
Sunderland	1,500,000
St. Josephs, U.S.A.	250,000
Spa	100,000
Sevenoaks	300,000
St. Petersburg	2,000,000
"	1,500,000
St. Louis, U.S.A.	2,000,000
"	2,000,000
"	1,000,000
Laclede	1,000,000
Silesian Coal Co.	600,000
San Francisco, U.S.A.	2,000,000
"	2,000,000
Sheepbridge Coal Co.	40,000
Stettin	200,000
Singapore	300,000
Sutton	500,000
Tonbridge	150,000
Tipton	400,000
Tottenham	1,000,000
Toledo, U.S.A.	750,000
Toronto	1,000,000
Uxbridge	300,000
Valparaiso	500,000
West Bromwich	1,000,000
Willenhall	250,000
Weston-super-Mare	500,000
Waltham	150,000
Wormwood Scrubs	300,000
Williamsburg, U.S.A.	600,000
"	600,000
Wellington	150,000
Warwick	300,000
Wheeling, U.S.A.	500,000
Walker	300,000
Westgate	100,000
Wilmington, U.S.A.	500,000
Windsor, N. S. W.	100,000
Wolverton	100,000
Wellington, N. Z.	250,000
Whitchurch	175,000
Washington, U.S.A.	2,000,000
Wallasey	750,000
Weimar	150,000
Wurzen	200,000
Worcester, U.S.A.	750,000
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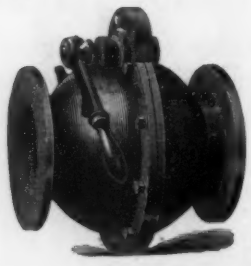

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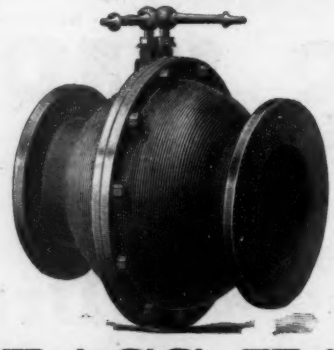
Quick Acting,
Simple,
Efficient, Durable.



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Automatic Action
Reliable
Simple, Durable.

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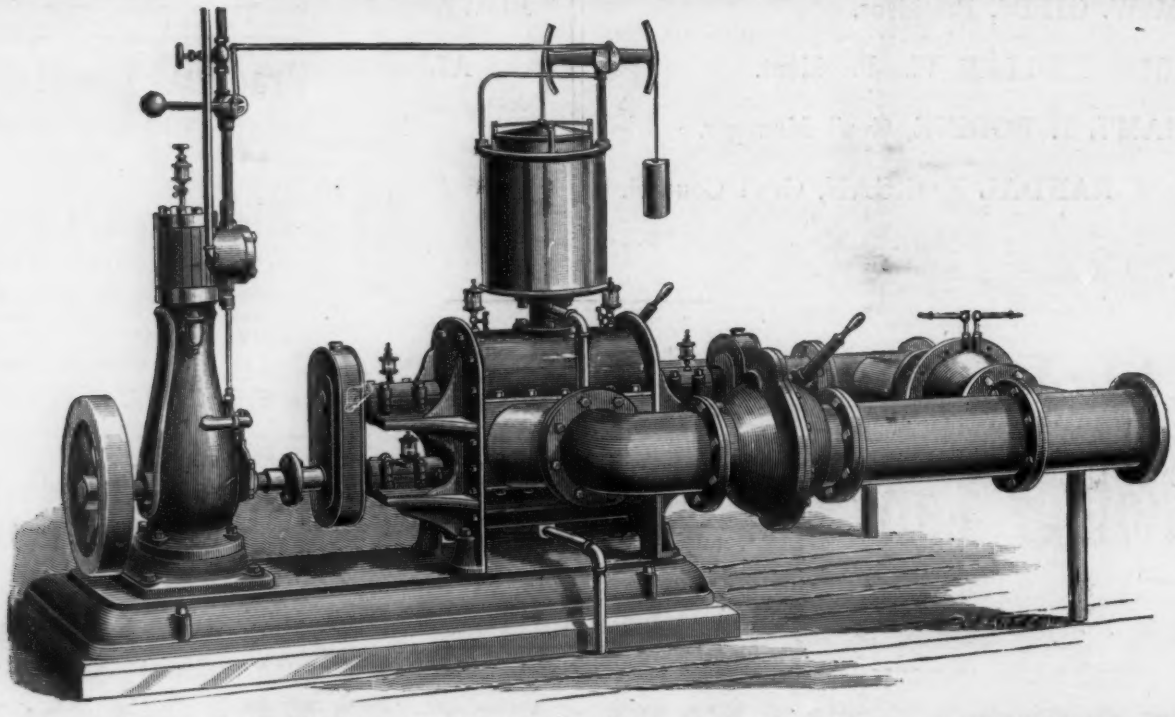

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All flanges of pipe and valve fittings faced off, with bolt holes drilled, all ready to go together.

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"IRON SPONGE." Saves money, saves labor, and is the most efficient purifying agent ever offered as a substitute for lime. Now used *in every State in the Union*, and purifying daily over *thirty-five million cubic feet.* Should be used in every gas works. Its own saving will pay for it many times over.

AUTOMATIC GOVERNOR. Has been on the market but *three years*, and in that time has been introduced *more generally* than any invention ever designed for use in gas works. Over *two hundred* of them now in use. Sensitive; reliable; perfectly automatic; reduces leakage; satisfies consumers, and gives great relief to the Manager. No gas works is *complete* without one of these machines.

STEAM JET EXHAUSTER. Designed particularly for small works Combines Exhaust Tube, Steam Governor Gas Compensator, and Bye-Pass Valves in the most compact form possible; occupies but little space; uses very little steam; operated by ordinary workmen; saves formation of carbon in retorts; increases yield 10 to 15 per cent. Specially adapted for *mixing air* with oil gas. *No works* too small to use them profitably.

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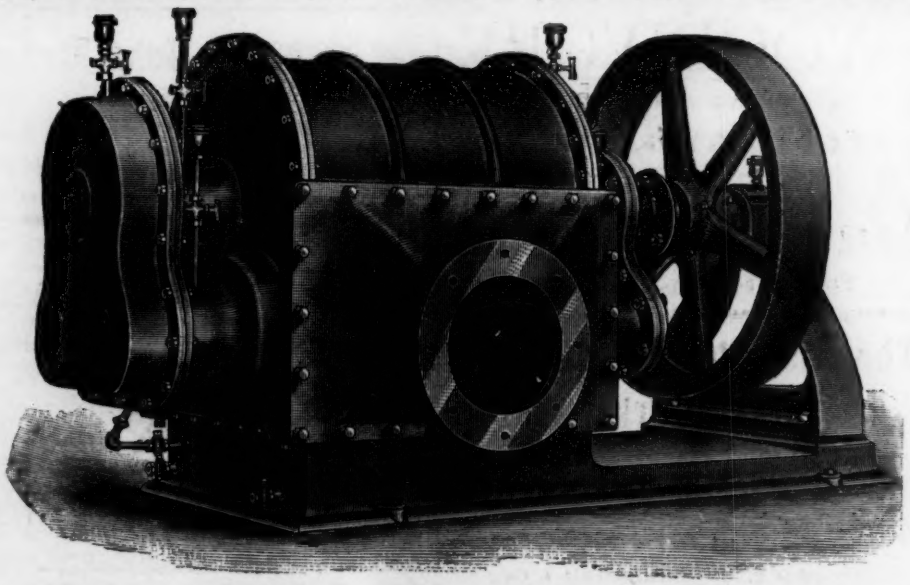

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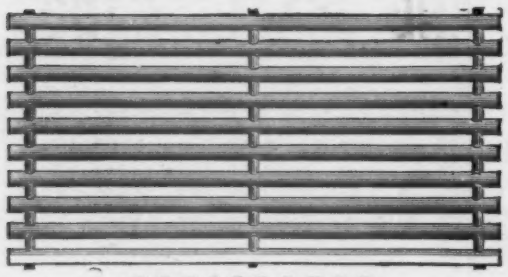

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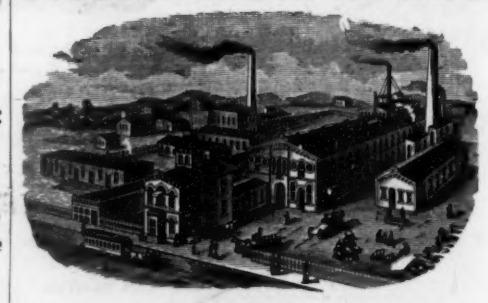

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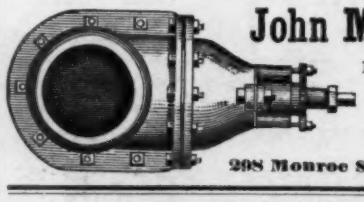

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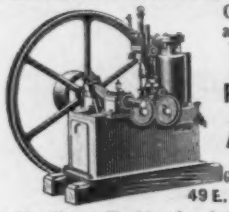

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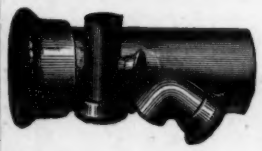

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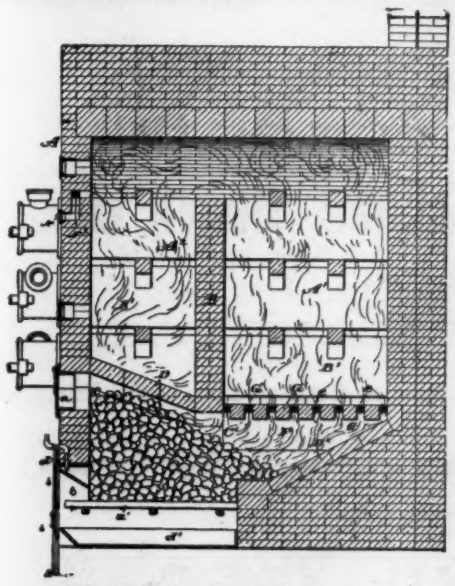

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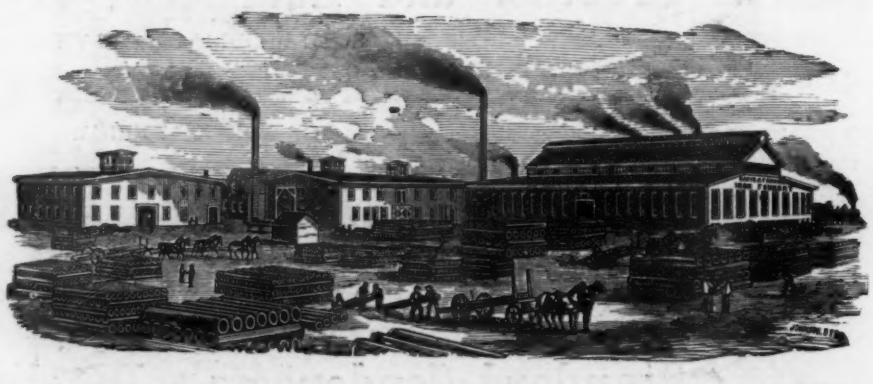

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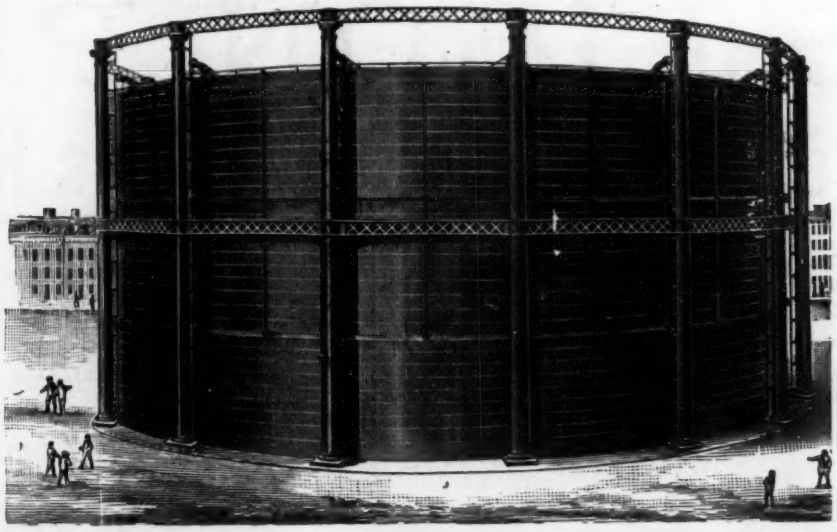

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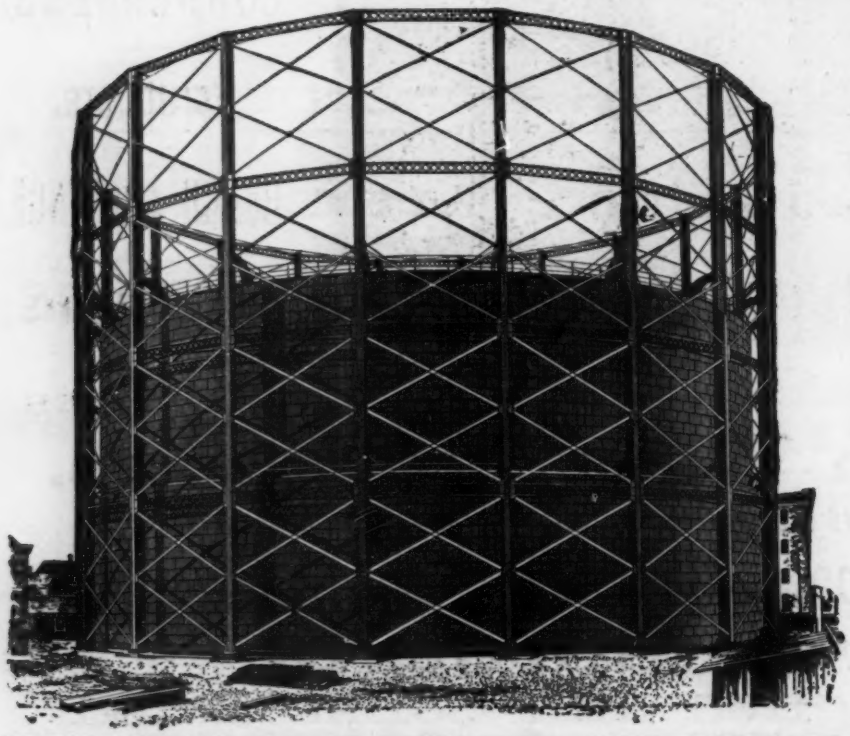

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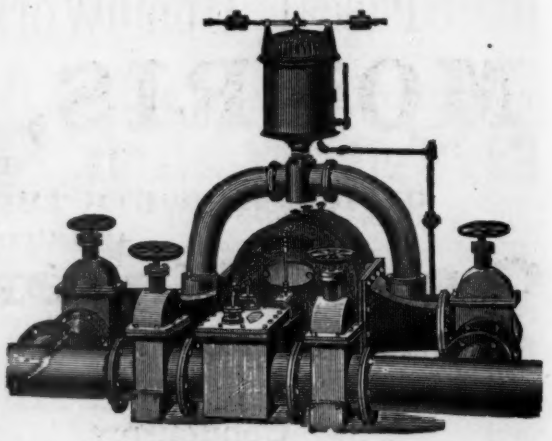

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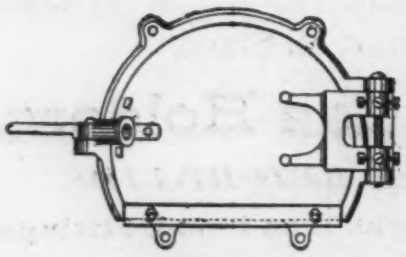

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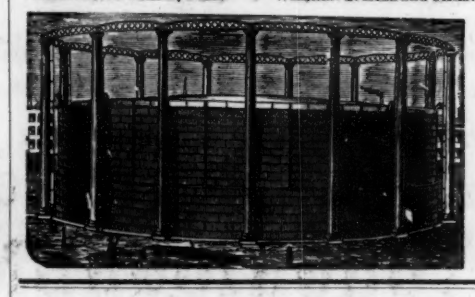

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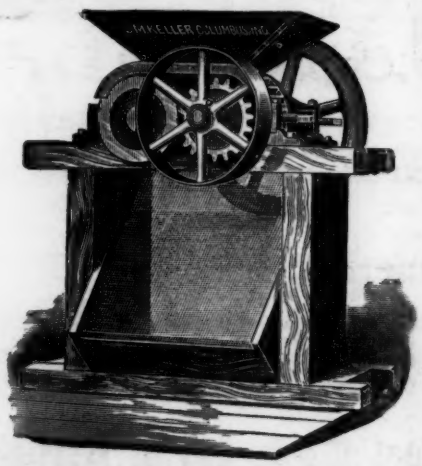

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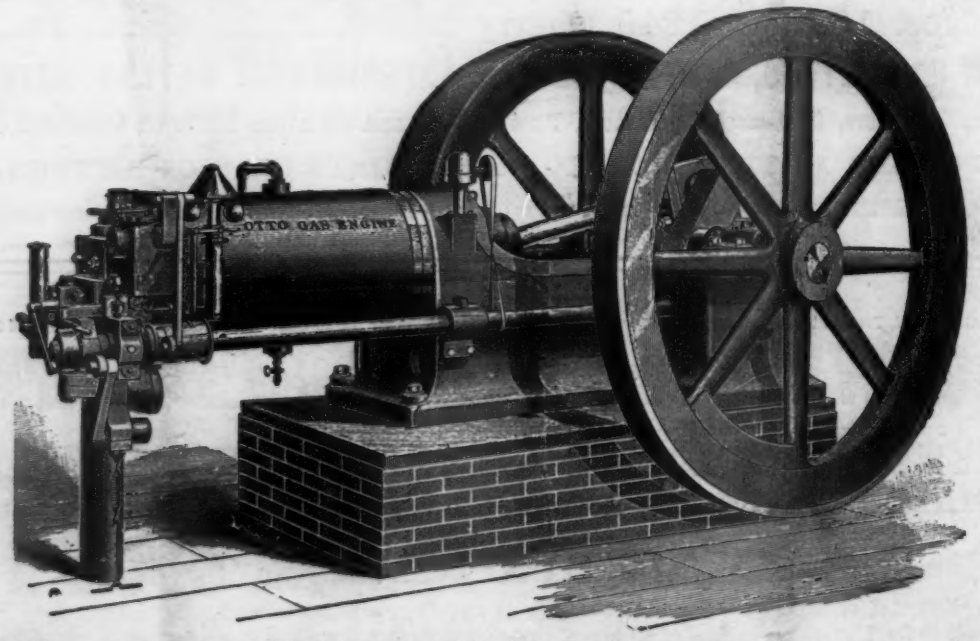

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